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Ethnoarchaeology of Egyptian mudbrick houses: towards a holistic understanding of ancient Egyptian domestic architecture.

ABSTRACT:

The subject of domestic architecture in ancient Egypt has attracted less attention than other aspects of Egyptian culture. The traditional approach to the study of ancient Egyptian houses has been formal and largely focused on the site of Amarna, and context and material have not been actively integrated into the study of ancient Egyptian domestic architecture. Moreover, a methodology for the study of ancient Egyptian mudbrick houses has never been developed.

Thus, the aim of this research is to develop a methodology for the recording, analysis and interpretation of ancient Egyptian house remains. For that purpose, this research has adopted a broad theoretical approach, which includes the consideration of universal interaction, contextual and material factors. Its main objective was to carry out an ethnoarchaeological study in order to further explore the associations between humans and buildings and their physical reflection on the house (material and distribution and use of space). Through the collection of interviews, architectural surveys and observation data in three different areas of modern Egypt – the Nile Delta, Upper Egypt and the Dakhleh Oasis – a series of categories were developed and key concepts for interpretation identified. These were applied to a number of archaeological sites across different areas and periods of ancient Egyptian history. The application of the modern data categories and concepts to the archaeological data allowed for the identification of a series of key variables responsible for architectural features and for distribution and use of space within the house. These were articulated into a methodology that, it is expected, will provide a standard means of recording, analysis and interpretation of ancient Egyptian mudbrick houses in the future.

Ethnoarchaeology of Egyptian mudbrick houses: towards a holistic understanding of ancient Egyptian domestic architecture

2 volumes. Volume I

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A la memoria de Javier

How very softly
you tiptoed into our world.
Almost silently,
only a moment you stayed.
But what an imprint
your footsteps have left
upon our hearts.

Adapted from
Dorothy Ferguson's
'Little footprints'

Note: All dates follow Shaw's chronology (2000).

Chapter 1: Introduction

1.0. Introduction

The aim of chapter 1 is to provide a rationale for the development of the thesis to follow in chapters 2-6 by explaining why this research is relevant, what it attempts to achieve, and how it will be accomplished.

In order to do so, the section 'Research background' will first outline previous approaches to the study of ancient Egyptian mudbrick houses, highlighting two fundamental obstacles for knowledge which this research has identified, namely the lack of tools for interpretation and the absence of an explicit methodology in previous literature. Secondly, it will explain the object of the research, that is, to overcome these obstacles by providing tools which can inform the interpretation of ancient Egyptian houses and to assemble those tools into a well-defined methodology. Lastly, it will describe the manner in which such tools have been developed by means of a holistic approach based on the combined study of context and building material in modern Egyptian mudbrick houses.

The following section 'Aims and objectives' will condense this rationale into a main aim, a series of sub-aims and a number of specific objectives that have been formulated in order to fulfil those sub-aims.

The 'Structure of the thesis' section will outline the contents of each chapter, specify the objective/s and the corresponding sub-aim/s it has fulfilled and how it has contributed to the accomplishment of the overall aim.

The 'Conclusion' section will summarise the contents of chapter 1 and will introduce Chapter 2, 'Theoretical framework and methodology'.

1.1. Research background

The number of ancient Egyptian settlements uncovered thus far is limited. The reasons for this are manifold: firstly, as a consequence of the annual flooding of the Nile plains, many historical settlements developed in high ground (*tells*), a geographical feature which is notably difficult to excavate (Bietak 1979, 97). Moreover, the annual flood caused many sites across history to be buried by the rising alluvium (Fairman 1949, 33; Bard 2000, 65). In addition, many modern settlements were built directly above historical valley settlements, making their excavation unfeasible (Bard 2000, 65). Further obstacles for the retrieval of domestic remains refer to the organic materials with which they were built, as mudbrick is particularly susceptible to erosion and weathering; moreover, the practice of taking away soil (*sebakh*) to be used as fertiliser further deteriorated or destroyed many of these remains (Fairman 1949, 33; Bietak 1979, 110).

Finally, the imposing Egyptian monumental architecture, such as pyramid, tomb and temple remains, and the fascination and public demand for the objects found therein, also contributed to divert attention from domestic architecture, resulting in a small number of settlement excavations (Bietak 1979, 97).

As a result, the consideration and interpretation of ancient Egyptian houses as a whole relied from the beginning on a comparison with the site of Amarna (see Fig.1.1), an over 400ha site located c.312km south of Cairo which contains overwhelmingly more information about an ancient Egyptian city than any other site in Egypt. This site, together with El-Lahun (located in the Fayum Oasis, c.91km south of Cairo, see Fig.1.1), was the first to provide substantial information about ancient Egyptian domestic architecture. Most of the site of El-Lahun was excavated by Petrie in 1888-1890, with further excavations in 1913-1914 and 1919-1920 (Petrie 1890, 1891; Petrie *et al* 1923), while Amarna was first excavated in 1891-1892 (Petrie 1894). Consequently, Amarna and El-Lahun were the sources used for the first attempt at drafting an evolution and classification of ancient Egyptian houses (see Ricke 1932).

The lack of sufficient archaeological remains also led to the use of pictorial and sculptural representations to interpret archaeological remains. Artistic portrayals of domestic architecture featured in the form of tomb reliefs and clay and wooden models (Bietak 1979, 105); already, these sources were used by early Egyptological literature to obtain information which was absent in the archaeological record and to interpret that which was present (see e.g. Borchardt 1916, Davies 1929).

Depictions of houses formed part of scenes featuring the deceased in Theban tombs, dating from the New Kingdom (c. 1550-1069 BC). However, there has not always been a clear correspondence between the appearance and layout of houses in these representations and the structures that can be found in, or inferred from, the archaeological record, often resulting in a number of different interpretations (see, for example, footnote 4 in Spence 2004, 124, on the various reconstructions of the number of floors in Theban and Amarnan houses). Despite the third dimension also being represented in some of these drawings, the artistic conventions used to portray architectural depth are unclear, causing the aforementioned interpretative differences. Their accuracy has also been challenged on the basis of their funerary context, which could have prompted an aspirational representation of an ideal house for the afterlife rather than an accurate depiction of reality (Davies 1929, 250).

Other artistic sources for the interpretation of ancient Egyptian houses, clay and wooden models, are also found in funerary contexts as part of tomb offerings, and date mainly from the Middle Kingdom (c. 2055-1650 BC) and New Kingdom periods (c. 1550-1069 BC). The most basic clay models could be simply representing offering trays (Fig 1.2. top left), while more elaborate examples feature schematised views of presumably modest houses (Petrie 1907, 20) (Fig 1.2. top right). Wooden models, usually plastered, mostly reproduce workshops, stables, bakeries and breweries, while models of residences tend to focus on gardens, only briefly suggesting certain house features behind (Fig.1.2 bottom). These clay and wooden models have been widely discussed in the literature (see Petrie 1907, 14-20 and Davies 1929 for the earliest discussions; also Roik 1988 for a comprehensive analysis). Nevertheless, the reliability of this source for the interpretation of ancient Egyptian houses has again been challenged on the basis of the uncertainty of the artistic conventions used.

The scarcity of ancient settlements found during the first half of the 20th century led to Egypt once being described as a 'civilization without cities' (Wilson 1960); however, this statement was soon refuted not only on the basis of its reliance on a narrow and modern definition of city (O'Connor 1972, 683; Bietak 1979, 98-100) but also in view of the new archaeological evidence which was emerging at the time as a result of incipient settlement surveys at Memphis, Abydos, Edfu and other southern towns (Kemp 1977a) and the beginning of regular excavations at Amarna, Tell el-Daba and Elephantine, amongst others (Bietak 1979, 98).

In 1977, B. J. Kemp undertook a preliminary survey of Amarna and consequently gained a concession to work on the site, funded by the Egypt Exploration Society. Since then, campaigns have been regular (published as monographs in Kemp 1984, 1985, 1986, 1987, 1989a, 1995a) and continue at present (Kemp 2010), providing a comprehensive picture of the city's urban structure.

The large amount of information extracted at the city of Amarna throughout years of excavation has resulted in the production of a large number of specific studies focusing on various aspects of life in the city, domestic architecture being the reflection of one of the spheres in which such life took place.

Thanks to parallel systematic excavations, such as those at Tell el-Daba and Elephantine, Amarna's exclusivity as provider of data regarding domestic architecture in ancient Egypt has come to an end. However, crucially, the house nomenclature and layouts developed as a result of the study of Amarnan houses have endured, both in the excavation reports of other sites and on the few contributions that have attempted a synthesis of findings across Egypt (see Bietak 1996a).

Thus, despite a larger number of excavated settlements, Amarna has continued to play a major role in the study of ancient Egyptian domestic architecture; nevertheless, the usefulness of taking its architecture as a referent has been challenged on the basis of it being a very short-lived site and the personal project of a particular pharaoh, Akhenaten (c. 1352-1336 BC) (Lacovara 1997). At the very least, the fact that the city was developed within a period of radical changes at both a religious and a political level raises doubts about the convenience of extrapolating this information geographically or temporally (Bietak 1979, 121).

The extensive use of Amarna data despite its limitations was a consequence for a long time of the scarcity of the information about ancient Egyptian houses. It was then also affected by the geographic and chronological disparity of other excavated remains, which hindered comparison and prevented any comprehensive study of ancient Egyptian domestic architecture by area or period. However, this reliance on

Amarna also illustrates the lack of development of other interpretative tools which could provide a more comprehensive understanding of ancient Egyptian houses.

A main cause for the absence of interpretative tools is the lack of application of a broad theoretical approach born from the acknowledgement that there are many different aspects involved in house inhabitancy, without which a complete understanding of domestic architecture cannot be achieved.

The research presented in this thesis is founded upon such a broad theoretical approach, which is supported upon three fundamental pillars:

i. The consideration of the universal interaction factors between humans and the environment and the role that buildings play in that adaptation. These universal factors refer to the relationship that humans establish with the surrounding environment, of which the built environment is a part. They also refer to psychological factors which affect the way in which humans perceive space – including architectural space – and the manner in which this influences behaviour.

ii. The evaluation of the particular contextual levels in which each house is immersed. The idea of context in archaeology refers to the connection of the object with its surroundings (Hodder and Hutson 2003, 171). Equally, houses are embedded within a context formed by a series of variables. This research has identified in broad terms the following variables, which will be the object of analysis: the environmental surroundings (both natural conditions and human modifications), the social and cultural characteristics of its inhabitants (e.g. status, class, gender), the particularities of each community (e.g. planned or organic settlements, workers or priests towns, etc.) and the individual preferences of each inhabitant.

iii. The acknowledgement of the importance that the material deserves in such a study, given that the vast majority of houses in ancient Egypt were made of mud. Consequently, how this material affects and is affected by the various contextual levels is central for the understanding and interpretation of the houses.

The impact of these factors in previous archaeological literature will now be examined.

i. The interaction between humans and the environment and the modification of the latter through the creation of settlements have scarcely been considered in the archaeological literature concerned with ancient Egyptian houses. The excavation work at Amarna pioneered the incorporation of a holistic idea of archaeology, one that aimed to ‘reconstruct the interrelationship between humanity and the environment in ancient Egypt’ (Kemp 1994, 133). However, the interaction factors involved in house inhabitancy have rarely been taken into account in the archaeological literature concerned with ancient Egyptian houses specifically. Crocker (1985, 58) partly took into account the psychological effects of space distribution when analysing status indicators in his study of 782 house plans at Amarna. With the exception of these contributions, universal factors have only been marginally considered, with a recurrent focus on the site of Amarna.

ii. The different levels involved in the specific context of the house have been individually considered in the literature, albeit sometimes indirectly. However, they have never been combined together in an explicit methodology for the study of the domestic remains in any particular settlement, not to mention for the study of ancient Egyptian domestic architecture as a whole, understood as comprising a house building process, distribution and use. Meskell (1998) considered the importance of spatial and temporal circumstances, applied exclusively to the use of space within the house at Amarna and Deir el Medina (a New Kingdom workers village linked to the Valley of the Kings, Luxor, c.500km south of Cairo, see Fig.1.1). Davies (1929) acknowledged that certain environmental and cultural factors (localisms, the town-country dichotomy or the effects of the Nile flood) could explain the differences in house appearance in Theban representations. The effects of environmental conditions in building components and space distribution at Amarna have also been the subject of several studies (Endruweit 1994, Crocker 1985, Tietze 1985, Tietze 1986, Spence 2004). Some of these studies (Crocker 1985, Tietze 1985, Tietze 1986) had the ultimate aim of identifying parameters which could offer clues about social differentiation, whether across classes (Tietze 1985, Tietze 1986) or within the upper class (Crocker 1985). In that sense, they dealt both with the environmental and social contextual levels identified by this research.

Social and cultural aspects were explored by Shaw (1992), who focused on the cultural meaning of the house as a whole, while Meskell (1998) studied the sociocultural aspects associated with the use of space; both of them relied substantially on texts to support their interpretation of the archaeological remains. This combination of archaeology and texts was prompted by the finding in Deir el Medina of an important quantity of documents narrating aspects of life within the town. Gender was a sociocultural aspect that received particular attention in the New Kingdom sites of Deir el Medina and Amarna (Koltsida 2007, Meskell 1998, Kemp 1979). Social relations have also featured in studies relating to productive economy, for example, bread making at Amarna (Samuel 1989 and 1999).

The textual information available at Deir el Medina prompted both a more comprehensive study of its sociocultural characteristics and the consideration of the community particularities. Although the purpose of a settlement has been used as an element of town classification (e.g. workers towns, priestly towns, etc) the specific circumstances of each community have not been systematically considered as part of a comparative analysis of ancient Egyptian domestic architecture.

Individual preferences, the most private contextual level, are extremely difficult to identify, particularly in the absence of a full picture which can confirm them as such. However, the fact that architectural choices must reflect at least certain individuality has been acknowledged. Although Kemp (1977b, 127) stated that ‘the notion that some of this information can be abstracted and put to good use demands a certain optimism’, the possibility that certain features in the archaeological record are reflecting individual preferences and not –or not exclusively- environmental, cultural, social or community distinctions must also be taken into account as a natural fact associated to house inhabitancy.

This holistic approach which takes into consideration environmental and social factors amongst others, has been recently applied to a synthesis of settlement studies in ancient Egypt (Bietak *et al* 2010); however, it has yet to be applied to the study of individual houses.

iii. The third aspect to be considered is the building material, which in the vast majority of cases in ancient Egypt was mud. The particular properties of mud are relevant in archaeological terms for the excavation, recording and interpretation of domestic remains. However, the peculiarities of excavating this material in Egypt have rarely been the subject of publication (i.e. Spencer 1994, Kemp 2000). Spencer (1979) remains the only work devoted to mudbrick architecture –not exclusively domestic- in ancient Egypt, in which, aside from compiling a corpus of all the remains found to that date, he develops a system for the recording of those structures. Nevertheless, by his own admission (pers. comm.), the book is now outdated given that many other sites have been excavated since its publication. Some issues associated with the influence of mud as a material in house inhabitancy, such as the natural organic development and the facility with which mud can reflect cultural traits have been considered (Shaw 1992, 148, 150), but material has never been a driving focus in the study of ancient Egyptian domestic architecture. For example, the house spatial distribution and use found in Deir el Medina and Amarna are frequently compared (see above) in spite of the fact that the vast majority of remains in the former are not made of mudbrick, while those in the latter are. Spence (2004) highlighted the importance of the physical dimension of architecture, and the important implications of understanding this for the interpretation, although not explicitly linking it to the building material but rather to the rules of architectural design. The physical properties of mud and its footprint on domestic life have therefore been neglected, thus ignoring a fundamental part in the understanding of ancient Egyptian domestic architecture.

In summary, the universal interaction factors, contextual levels and material properties which are considered essential for a comprehensive study of mudbrick houses in ancient Egypt have featured in some of the literature, but they have been dealt with independently and not within a broader theoretical approach which could transform them into useful interpretative tools. This research therefore seeks to articulate all those factors into a specific theoretical approach based on the combined study of context and material, which overcomes the deficiencies of previous approaches. The contextual analysis aims to give meaning to each site by itself and not exclusively in relation to Amarna, and the material analysis strives to help reconstruct the physical reality of these structures, which, as described, is unclear from the artistic representations.

This combined analysis will be used to develop tools which can be translated into a specific methodology for the study of ancient Egyptian mudbrick houses.

The purpose of developing a methodology that can be applied to all sites is to standardise the information in order to facilitate comparison between houses, both across space and time. Contextual analysis encourages comparison (Barrett 2006, 195), thus avoiding the predominance of Amarna as a paradigm. The obvious convenience of developing analogies in order to provide understanding is manifest in the house size comparisons between sites that permeate much of the literature (e.g. Kemp 1977b, 129; Arnold 1996, 14); however the lack of a parallel deep and broad study of the correlation between contextual and material aspects reduces this comparison to formal aspects such as those mentioned. Formal aspects have been used, for example, to justify the use of certain Amarna houses as an architectural archetype (Spence 2004). However, the quantitative recording of such formal aspects (e.g. Crocker 1985, Tietze 1985) is problematic when it comes to reflecting sociocultural factors, which are not easily quantifiable.

To provide a holistic understanding of the house, the methodology proposed needs to be interdisciplinary, in accordance with the theoretical principles upon which it is based. It is therefore necessary to make use of the specific methods of various sciences for the study of buildings on one hand (architecture) and people inhabiting them on the other (anthropology).

In order to acquire the tools necessary for the development of this methodology, the research, in addition to considering universal interaction factors, has analysed such contextual and material factors in modern Egyptian mudbrick houses. Three areas (the Nile Delta, the valley and the Dakhleh Oasis) were selected for an analysis of the contextual factors described –environmental, sociocultural, community and individual particularities- and their effects on mudbrick domestic architecture. In addition, since modern Egyptian mudbrick houses generally employ the same building materials and techniques as those used in ancient Egyptian times, a study of the physical properties of mud and their effect on house appearance, distribution and use of space was undertaken. For these purposes, architectural surveys of mudbrick houses, observations and interviews with house owners were carried out.

Ultimately, the use of ethnoarchaeology allowed the application of these findings to the archaeological record. Shaw (1992) briefly included ethnography as a source to understand the cultural meaning of the house, while Eigner (2006) explicitly suggested the convenience of comparing architectural elements from ancient and modern Egyptian mudbrick houses. However, the use of ethnoarchaeology in this research goes further and establishes itself as a fundamental tool to allow the application of the framework developed in the study of modern structures to the archaeological record.

In summary, the research methodology needs to consider the universal interaction factors, to test the potential importance of the various contextual levels in each case, and to apply the knowledge regarding material in order to attempt a comprehensive comparison of house building, distribution and space across time and space in ancient Egypt, one that can further the knowledge of ancient Egyptian domestic architecture as a whole.

1.2. Aims and objectives

The overall aim of this research is to offer tools for a holistic interpretation of ancient Egyptian domestic architecture remains based on the combined study of context and material in modern mudbrick houses, and to articulate those tools into a methodology. This aim will be achieved by means of an ethnoarchaeological study of ancient Egyptian mudbrick houses, the main objective of this research.

Sub-aim 1: To explore the ways in which universal interaction factors affect the domestic sphere and to investigate the manner in which contextual levels – environmental, sociocultural, community-related, individual-, have influenced the surviving mudbrick houses in Egypt, in particular over the last century, in order to achieve a theoretical understanding of factors potentially influencing domestic architecture.

Objective 1: To compile information regarding the processes which in the last century could have had an indirect or direct effect on the structure, appearance and development of mudbrick houses in different areas of Egypt. To collect information about the way in which those processes still reflect on surviving houses through fieldwork, i.e. by means of interviews and observation.

Sub-aim 2: To increase the knowledge about the construction process, the characteristics and the development of modern mudbrick houses in order to gain a better understanding of the physical aspects of the archaeological remains.
Objective 2: To undertake architectural surveys of houses, record details and perform observations in two environmentally different areas of Egypt (the Delta and the Nile valley) and to complement this information with the limited amount of surveys and observations already published.

Sub-aim 3: To apply the knowledge regarding contextual factors and material properties towards a comprehensive understanding of modern mudbrick houses in each one of the chosen areas.
Objective 3: To investigate and describe the way in which the particular contextual circumstances and the material reflect on architectural features, distribution and use of space in modern mudbrick houses.

Sub-aim 4: To examine a series of archaeological sites in light of the result of the study of modern mudbrick houses, in order to show the potential of this approach.
Objective 4: To apply the method used in the analysis of modern mudbrick houses to the investigation of the contextual levels – environmental, sociocultural, community-related, individual – and material characteristics of a series of archaeological house remains in order to attempt a new understanding of the material.

Sub-aim 5: To articulate the developed tools into a methodology for the study of ancient Egyptian domestic architecture and to develop guidelines for future work.
Objective 5: To provide a tool that can be used for the interpretation of house remains to be excavated.

1.3. Structure of the thesis

This thesis is divided into six chapters:

Chapter 1 ('Introduction') has provided a background for the motivations behind the thesis, briefly outlined the theoretical approach and methodology that have informed the research, summarised the aims and objectives, and outlined the structure the thesis will follow. It has sought to explain the main aim of the thesis.

Chapter 2 ('Theoretical framework and methodology') will discuss the way in which other sciences have approached the subject of built space, with a focus on the universal interaction factors which are one of the three pillars upon which the study of both modern and ancient material is founded. It will also describe the methodology employed for the data collection, analysis and interpretation. Thus, this chapter will explain both the philosophy that informs the main aim and the methodology that will be used to accomplish it.

Chapter 3 ('Analysis of modern mudbrick houses') will concentrate on the study of the modern material. This chapter, background data for which can be found in detail in the Appendix, will first introduce the data sources and their scope; then, it will analyse the contextual background in which the houses are immersed and describe the materials by area. Finally, it will establish the relation of context and material with the architectural features and the distribution and use of space (sub-aim/objectives 1, 2 and 3). Consequently, this chapter will perform the study of material and context in modern houses in order to fulfil the main aim of developing tools for the interpretation of ancient Egyptian houses.

Chapter 4 ('Analysis of ancient mudbrick houses') will test the methodology used for the study of the modern mudbrick houses (Chapter 3) on the archaeological material. It will analyse the context and the material available, and use the inferences from the modern material to attempt an interpretation of architectural features and distribution and use of space (sub-aim/objective 4). Therefore, this chapter will analyse the ancient remains in the light of the method previously established, in order to identify the tools to be developed. Chapters 3 and 4 are at the core of the thesis' main objective, that of developing an ethnoarchaeological study of ancient Egyptian mudbrick houses.

Chapter 5 ('Interpretation') will put forward the interpretation of the data presented. It will outline the results obtained from the ethnoarchaeological study and its repercussions for the research of ancient Egyptian domestic architecture. It will also present the methodology developed for the study of domestic remains, in the form of an interpretative tool (sub-aim/objective 5). This chapter will extract the relevant tools from the ethnoarchaeological study and will articulate them into a methodology, therefore fulfilling the main aim. It will also detail its implications for previous studies and for the interpretation of the archaeological record. Lastly, it will analyse the contributions and limitations of the research from a theoretical and methodological point of view.

Chapter 6 (‘Conclusion’) will reflect on the way in which the new methodology may affect future approaches to the study of ancient Egyptian domestic architecture, and propose a series of recommendations based on an evaluation of the strengths and weaknesses of the research (sub-aim/objective 5). Consequently, this chapter will reflect on what has been achieved through the research and suggest guidelines for future work.

1.4. Conclusion

This chapter has opened with an introduction explaining its aim, as well as the parts into which it would be divided. It has explained the gaps in previous approaches and provided a new theoretical framework to approach ancient Egyptian domestic architecture, as well as highlighting the need for a systematic methodology. It has then outlined the main points that that methodology is based on, namely a study of interaction, contextual and material factors involved in house inhabitancy. It has also defined the exact aims and objectives into which these new theoretical framework and methodology have translated. Lastly, it has presented a summary description of the contents of each one of the chapters in the thesis and specified the aims and objectives to be fulfilled in each chapter.

In summary, chapter 1 has provided an introduction to the thesis as a whole, and a basis to understand the theoretical approach and methodology which will be outlined in chapter 2.

Chapter 2: Theoretical framework and methodology

2.0. Introduction

Chapter 1 defined the main aim of the thesis as providing tools for the investigation of ancient Egyptian domestic architecture through the development of an explicit methodology for its study. It consequently explained that such methodology would have its foundations in a theoretical approach which considered the act of inhabitancy in a holistic manner, and defined that holistic sphere as being formed by interaction, contextual and material factors. In accordance to that main aim, which was to be achieved through an ethnoarchaeological study of Egyptian mudbrick houses, a series of sub-aims and corresponding objectives were proposed.

The aim of chapter 2 is to justify and explain in detail the holistic approach which informs the theoretical framework, and the manner in which this approach has been translated into the methodology to be employed for the research.

The 'General discourse on ancient Egyptian houses' section will explore the bases that have formed the typologies and nomenclature commonly accepted and applied to the study of house remains, highlighting the reasons why these categories and terms are deemed unsatisfactory.

In the 'Theoretical framework' section, the approach that this research has adopted in order to fill in the gaps of previous interpretations will be described. Accordingly, interaction, contextual and material factors will be explained. While universal interaction factors lend themselves to a more extensive theoretical explanation, the strength of contextual and material factors is in their practical application, which will be the object of chapters 3 and 4.

The 'Methodology' section will describe the reasons why ethnoarchaeology has been identified as an appropriate tool to fulfil the main aim of the thesis, thus resulting in the main objective being an ethnoarchaeological study of Egyptian mudbrick houses. It will then describe the specific methods of data collection, analysis and interpretation used to fulfil each of the objectives specified in chapter 1.

The ‘Conclusion’ section will summarise the contents of chapter 2 and will introduce chapter 3, ‘Analysis of modern mudbrick houses’.

2.1. General discourse on ancient Egyptian houses

Chapter 1 explained the bases of previous approaches to the study of ancient Egyptian houses and the reasons why this research proposed a new theoretical approach and methodology. It highlighted the fact that, although new settlements have been uncovered, the layout typologies and nomenclature developed from the analysis of the large amount of information available at Amarna have endured in the general discourse. These categories and terms developed from a formal analysis of floor plans, upon which the discourse regarding the distribution and use of space has been largely based.

In order to understand the reasons that have motivated the development of a new approach within this research, those previous approaches will now be outlined and then analysed.

2.1.1. Previous interpretations of house spatial distribution

Ricke’s (1932) comparative study of house floor plans at Amarna laid the foundations for the investigation of ancient Egyptian house plans thereafter. His research became a lasting point of reference for its identification of two types of floor plan which he believed were central to Ancient Egyptian domestic architecture: the tripartite plan and the standard Amarna villa (see Arnold 1989, Von Pilgrim 1996, Bietak 1996a). Ever since Ricke coined the term *einfacher dreiteiliger Grund-riß* (simple tripartite plan) to describe some of the less elaborate houses found in Amarna, not only there has been a general agreement amongst Egyptologists regarding the existence and importance of this tripartite layout across ancient Egyptian history, but it has also been identified as the most common floor plan in ancient Egyptian houses (Von Pilgrim 1996, 190).

Ricke’s study concluded that floor plans could be divided into several categories, starting from a simple one-room house, and culminating in the so-called *Amarna normalhauses* (Ricke 1932, 3) (Fig. 2.1), known in English as ‘standard Amarna villa’ (Lacovara 1997, 58) whose development could only be understood in connection with its, alleged, primitive one-room version. The *normalhauses* were an evolution of the tripartite floor plan, characterised by a tripartite division, featuring a front section –which included an entrance, a vestibule and a long hall- a middle section with a square central hall, often associated with a rectangular side hall and a staircase leading to an upper storey; and a third section, corresponding to the private area of the house, where bedrooms, bathrooms and additional guest/servant rooms, as well as storage areas, were located (Lacovara 1997, 58). Not only did Ricke think of this distribution as the most perfected version of the Amarna house, but also as the result of an inceptive floor plan developed throughout Egyptian history and that had its culmination in the Amarna period (Ricke 1932, 4). According to Baldwin Smith (1938, cited by Arnold 1989, 88) Ricke based this interpretation on the assumption that the original, simpler models of houses would have become less common through time in favour of more complex plans and would, therefore, only have survived as examples of low-class housing by the time of the Amarna settlement.

Between the simplest floor plans and the fully-developed Amarna villas, Ricke identified a series of examples of medium-sized houses which he termed 'interim solutions' (*Zwischenlosungen*) (Ricke 1932, 4). Lastly, a small number of structures of extraordinary proportions, rather like farmsteads, were named 'individual solutions' (*Einzellosungen*) and labelled by Ricke as exceptional (1932, 4).

This evolutionary interpretation of house plans –but not the house types proposed- was challenged from the outset (see Scharff 1932 and Frankfort 1933 cited in Von Pilgrim 1996, 193). Frankfort (1933) acknowledged the different house plan types described by Ricke, but he attributed them to variations of a same original form –the tripartite arrangement- which could have occurred simultaneously, as opposed to representing stages of an evolutionary development.

More recently, Bietak (1996) also challenged Ricke's interpretation by proposing two house plan types which would have partially overlapped throughout time (Fig. 2.2). The first one, group A or Tell el-Daba type, was a tripartite arrangement in which the main living space would have been flanked by one or several so-called 'adjoining rooms' (*nebenräume*) (within which bedrooms were also included). This type could be identified in the Tell el-Daba houses and the Kahun mansions. In Tell el-Daba, three subtypes were identified, according to the presence and position of other rooms in respect to a central space common to all: those with one adjoining room (type I), those with one adjoining room and a vestibule (type IIa) and/or a back room (type IIb), and lastly, those with adjoining rooms at either side (type IIIa) which could also present a vestibule and a back room (IIIb). On the other hand, the mansions at Kahun displayed a larger version of the Tell el-Daba dwellings of the late Middle Kingdom (Bietak 1996b, 31). They had a central, main living area with adjoining rooms at the sides, both of them accessible from the main space; they also featured a north facing entrance that was not aligned with the central axis of the house. An adjoining room to the west would have served as bedroom and others as bathrooms or dressing rooms. The identification of rooms as bedrooms is based on the presence of alcoves, some of them occupied by mud benches, which would have served as beds, as well as on the presence of wind-hoods in Theban representations (Fig. 4.48a), which the niches would have supported (Spence 2004, 127) and which would have helped keep the bed cool. The existence of bathrooms/toilets is suggested by the presence of stone basins and waterproof walls which would have served as protection from water (Spence 2004, 127) (for a skeptical view on the existence of bathrooms and toilets, see Meskell 2002, 121).

Consequently, according to Bietak (1996, 31) residential units of types II or III from Tell el-Daba can be identified in larger residencies which are more akin to estates, such as those at Kahun (Fig. 2.3, in black). Such house complexes contained the main household core as well as accommodation for further family or servants; these dependents' quarters would have been arranged in a hierarchical level in accordance to the closeness of their ties to the owner of the house.

Despite identifying smaller domestic units within them, Bietak (1996, 37) also described the Kahun mansions as following the arrangement of a palace overall, rather than that of an ordinary house.

In the second type, group B or Amarna type, the mentioned 'adjoining rooms' were located at the back of the house or, in a more elaborate arrangement, surrounding all sides of the main living space. Although characteristic of the standard Amarna villa, this arrangement would have already existed in the Old Kingdom (Bietak 1996b, 37). A common variation of this tripartite layout with adjoining rooms at the back would have been a basic tripartite plan, formed by two identical spaces, the one at the back subdivided into two equal small rooms (see Fig. 2.2, group B, type I).

The main difference between groups A and B was therefore the location of the adjoining rooms in relation to the main living space (Bietak 1996b, 24).

Contrary to the Kahun mansions, the Amarna villas would not have integrated the smaller residential units designed for dependants – and corresponding to certain Tell el-Daba types – within the main house; instead, these units would have been found as separate outbuildings within the estate.

Bietak's approach was therefore not solely functional – as was Arnold (1989)'s approach in his opinion – but also formal (Bietak 1996b, 31).

Prior to Bietak, Arnold (1989, 75) had already rejected Ricke's claims that the Amarna villas were the culmination of a floor plan developed through millennia on the basis of the lack of enough material from earlier sites at the time of Ricke's study. Nevertheless, Arnold did not completely reject a chronological development. Rather than identifying them as two different types, Kahun and Tell el-Daba houses on one hand and Amarna houses on the other, he saw the Amarna villas as an evolution of the Kahun mansions. The Middle Kingdom Kahun mansions were characterised by the presence of a central courtyard which gave access to all other rooms, a central space in what Arnold termed the 'Mediterranean court-centered house' which may have appeared as early as the Old Kingdom (Arnold 1989, 90). However, this courtyard underwent a major development by becoming roofed during the New Kingdom (Arnold 1989, 80) (see Figs. 2.3 and 2.1). For Arnold, the houses of the Second Intermediate Period at Tell el-Daba would be but a stepping stone in the evolution from the Kahun to the Amarna house type (Arnold 1989, 80). Roik (1988, 208) also saw fundamental similarities between the Middle Kingdom mansions at Kahun and the main living structure in the Amarna farmsteads.

In addition, Arnold proposed three significant stages in the development of the ancient Egyptian house, prior to the appearance of the Mediterranean court-centered house: the rectangular house would have appeared as an alternative to the original circular prehistoric house around 6000 BC; by 3000 BC, the former would have fully replaced the latter (Arnold 1989, 89). This rectangular house was to be the prototype of the longhouse, whose importance continued until the late 13th dynasty (c. 1773 – 1650 BC) (Arnold 1989, 90).

On the other hand, Lacovara (1997, 60) not only challenged the level of representation of the standard Amarna villa as a development of all prior ancient Egyptian floor plans, but also questioned Arnold's theory that Kahun houses were the precursors of the Amarna villa. His main argument was that the Amarna villas, far from being 'standard', were an isolated development based on an intentional imitation of New Kingdom palace architecture (Lacovara 1997, 60) (Fig. 2.4) and therefore an abnormality in the evolution of the ancient Egyptian house.

Lacovara also proposed an evolution of the ancient Egyptian house plan, one that did not revolve around an original tripartite floor plan but around the idea of the so-called 'divided court'. The 'divided court' was a basic layout represented in the hieroglyph  and whose origin would have been in wattle and daub structures, already turned into mud brick buildings during the Early Dynastic Period (c. 3000 – 2686 BC) at Hierakonpolis (Lacovara 1997, 66). The potential of this single unit would have been its ability to be reproduced an infinite number of times to produce multiple layouts resulting in a large number of house sizes (Lacovara 1997, 66) (Fig. 2.5). An example of one of these permutations could be seen in Kahun houses, with the further splitting of the 'divided court' into three separate rooms, to which a front court or portico was added (Lacovara 1997, 66). While this arrangement still existed in the New Kingdom, an alternative appeared, namely a tripartite division in which each room was accessed through the previous room (Lacovara 1997, 67). However, as opposed to an evolution of the 'divided court' taking place, floor plans would have returned to simpler forms of the 'divided court' after the Amarna period, as exemplified by Medinet Habu houses dating to Dynasty XX (Lacovara 1997, 67). Therefore, Lacovara followed Frankfort in rejecting a chronological development of the ancient Egyptian house, in favour of a variety of types originating from a simpler prototype – the 'divided court' in Lacovara's case and the simple tripartite arrangement in Frankfort's.

Von Pilgrim (1996, 190) also highlighted the importance of the tripartite arrangement, which he classed as the most common house plan type in ancient Egypt. He defined the tripartite form as formed by three sections, with at least one of them not being subdivided into further rooms (Von Pilgrim 1996, 190).

However, he also classified Bietak's group B, type I (see Fig. 2.2) as a simplified version of this arrangement.

The tripartite plan can extensively be found in Middle Kingdom Elephantine; however it would have coexisted with the central courtyard/hall house which can also be found on site (Von Pilgrim 1996) (see Figs. 4.25 and 4.24 respectively).

Tzietze (1985) saw the different floor plans at Amarna as formal variations within certain categories that he established according to size, function, equipment, building material quality and temperature performance. Following these combined criteria, he identified eight different groups of house types within Amarna's Main City (Tietze 1985, 84) (Fig. 2.6). Four of these house types corresponded to low quality and extremely tightly-arranged houses (1a-1d); another three house types showed a wide range of sizes and equipment, with an extended arrangement in the forms of separating courtyards (2c-2e). The last type corresponded to extremely large properties which included various yards, and outbuildings such as workshops, stables, granaries and servants' lodgements (3e). The particular formal floor plans into which all these factors were translated could coincide between different categories. Janssen (1983, 283-85), on the other hand, identified five different types of houses according to their areas and the number of rooms in them.

Lastly, some have seen a paralellism between the tripartite arrangement of the Kahun houses and the structure of the temple. Steindorff (1896, 108) was one of the first to affirm that the 'house of god', e.g. the temple of Ramses III in Karnak, was designed as an imitation of the ordinary house floor plan. He saw in both the following basic structure: an open hall with a decorated courtyard, a pillared hall, and a private chamber at the back; the fact that the 'ordinary' house floor plan was a tripartite floor plan was therefore implicit in his statement. Lacovara also noted parallelisms in the tripartite arrangement of both the floor plan of Kahun mansions and the core of Egyptian temple architecture (Lacovara 1997, 67).

Bietak (1994) took this appraisal further by comparing some Middle Kingdom small private commemorative temples with some contemporary houses in Tell el Daba, finding important parallelisms between their floor plans (Bietak 1994) (Fig. 2.7). He analysed temple I (old and new phases, stratum E/3 and E/2-1) and temple V (old and new phases, stratum E/3 and E/2-1). All four structures shared the same orientation and function. However, only temple V in its new phase had a stairwell, which suggested that in the other three perhaps the roof –access to which would have been necessary for cultic reasons- would have been reached via an external staircase, probably made of wood (Bietak 1994, 424). A similar stairwell was also found in the Ezbet Rushdi temple as well as in 'villa 2' of Tell el Daba's F/I settlement (E/3) (Bietak 1994, 432).

These temples were divided into a *procella* (*Erscheinungssaal* or hall of appearance, Bietak 1994, 424) occupying the whole width of the building, and a back section split into three, with a central main offering room and cultic rooms at either side; these adjoining rooms normally being slightly narrower than the central room. He then saw a parallelism with the floor plan of some Tell el-Daba houses which contained a vestibule followed by a main room with adjoining rooms at its sides, of which one could be a bedroom (Bietak 1994, 428).

The temple at Ezbet Rushdi would have not been private according to Kees (1962, cited in Bietak 1994, 426), and this would account for the more elaborate design in comparison to the private small temples in Tell el-Daba. In spite of this, the dimensions of the rooms were very similar, with substantial variation only in the thickness of the walls. Another parallel was found in Elephantine, where a private temple had a very similar structure with minor variations (Bietak 1994, 427).

This spatial arrangement of temples subsequently became considerably popular in the New Kingdom, as seen in the Temple of Ptah at Karnak (Bietak 1994, 428). These temples share with Middle Kingdom houses the peculiarity that the accesses to the adjoining rooms at both sides of the sacrificial room were located immediately after entering the sacrificial room (see Fig. 2.7, floor plans 1-3).

The exception to these parallelisms would have been temple I in its old phase, which bore more in common with the late Middle Kingdom snail house type at Tell el-Daba, seen for example in the priest house in temple district a/II, stratum E/3 (Bietak 1994, 431) (see Fig. 2.7, floor plans 4 and 5).

The private temples and the houses at Tell el-Daba, the temple of Ezbet Rushdi, the private temple at Elephantine and the temple of Ptah at Karnak, all shared the same orientation (Bietak 1994, 426, 432). Bietak (1994, 432) concluded that the origin of the private chapels could have been in the location of important burials within houses, which would have been abandoned and only returned to for the performance of sacrifices.

Lastly, another formal aspect, studied in particular to define social status, has been house size; Tietze (1985) took into account size as a factor for his classification of 500 houses in the Main City at Amarna, as explained above. His conclusion was that Amarna enjoyed an efficient and stable society, which may have been helped by social differentiation between and within classes, and by being united under the strength of Akhenaten. Within this structure there would have been a broad range of social relations, from fully dependent to cooperative (Tietze 1986, 78).

Arnold (1996) also echoed this approach, and used it to compare house sizes mainly between Lisht, Kahun, Amarna and Deir el Medina. Using house size as a direct indication of social status, he concluded that the inhabitants of Lisht were generally of a higher status than most of the inhabitants of Kahun, but not as wealthy as those living in the Kahun mansions; their social status was most likely comparable to that of some inhabitants of Elephantine and to the priests of Giza and Dahshur (Arnold 1996, 15). Kemp (1977b) also compared the house sizes of Amarna and Deir el-Medina, pointing out that, in the case of Amarna at least, this was only one factor to be studied (Kemp 1977b, 132) as the organization of the surrounding space should not be neglected; however, he also pointed out that the strength of this surrounding space as status identifier diminished from a certain undetermined house size, as a size correlation between the house and its surrounding space could no longer be determined (Kemp 1977b, 133).

Also concentrating exclusively on Amarna, Crocker (1985) studied 728 houses and classified them in relation to 32 architectural attributes, deemed to have potential status value (Crocker 1985, 52). He created a database in which the presence/absence of certain features, numerical and measurable attributes were represented (Crocker 1985, 52-53) and ranked them according to their recurrence. He achieved the conclusion that the scale of social ‘impression’ caused by the houses was determined by their degree of adaptability to the harsh climate (Crocker 1985, 65), as the presence of features which allowed a higher degree of comfort in relation to the heat was seen as indicative of a high social status.

In spite of the variety of studies undertaken, an important aspect that has been rarely considered within the analysis of the variables is the presence of upper storeys, even though these can have an important effect in characteristics such as climate performance (Spence 2004, 123). From her study of 152 houses at Amarna, Spence concluded that it was highly likely that most of those houses had a first floor. She evaluated the position of the stairs, the recurrence of the central hall and the presence of wind-hoods over bedroom niches to argue that this first floor would have normally occupied two thirds of the ground floor's roof (Spence 2004, 134). In the cases where the ground floor had a 'parallel-zoned' arrangement, the first floor would have occupied the front rooms and, in most cases, the central hall and flanking rooms created a terrace at the back, while in the 'perpendicular-zoned' arrangement this terrace would have been left at the side instead (Spence 2004, 134). This approach assumed that the walls of the first floor – at least the main ones – would have followed the walls of the ground floor (Spence 2004, 129).

Spence's study of the position of the stairs revealed a significant and constant position between the wall dividing the front rooms and the middle rooms, which would be meaningless were the stairs to lead exclusively to an open roof rather than to rooms (Spence 2004, 131).

The requirements for light and ventilation of the central hall would have also conditioned the house form (Spence 2004, 129), particularly in relation to the bedroom, where the presumably existing wind-hood over the niche would have needed open roof space in front in order to work efficiently, consequently discouraging the building of an upper storey on top (Spence 2004, 129). In summary, the existence of the wind-hood and the central hall would have meant that it was not possible for the first floor to occupy all the roof of the ground floor. In spite of this general trend, she acknowledged that there could be possible variations due to the needs and economic situation of the inhabitants (Spence 2004, 134). The main limitation of this approach is that it allowed little flexibility in the diachronic evolution of the house, with the alterations typical of mud houses – although it is possible that these would have concentrated mainly on light or low walls or that the upper floor would have been consequently altered to match these changes in the ground floor.

The existence of upper storeys has important implications for the use of space, which will be analysed in Chapters 3 and 4.

2.1.2. Previous interpretations of house space

The study of ancient Egyptian house space has traditionally been approached on the basis of room position (e.g. front, middle and deep) and function (e.g. room or hall), according to which rooms were given names. The attribution of names according to room position mainly served the purpose of determining distribution and gave no information as to the function of the room. Those terms were in any case attached to a particular group of houses, the standard Amarna villas, for whose rooms names such as ‘middle room’ and ‘deep hall’ were first used (see Ricke 1932). These terms still remain in use (see Arnold 1996) and are openly preferred by some authors (see Spence 2004, 127). Sometimes the position and the shape of the rooms can be combined within the same terminology, e.g. ‘broad hall’ and ‘square room’ (Ricke 1932). While this approach is useful in that it does not impose functions to particular rooms, it presumes a continuation of specific plan arrangements, namely related to those of Amarna houses. To this, room hierarchy has sometimes been added (see e.g. ‘main hall’ in Arnold 1996) as well as cultural considerations (see e.g. ‘private chamber’ in Arnold 1996).

This is symptomatic of the difficulty of not only labelling rooms by their function, but of identifying similar characteristics between rooms by virtue of such function, position, importance or cultural sensitivities. Nevertheless, function has been traditionally established according to the artefacts found in each space, to which more recently ecofacts have been added, particularly in long-duration excavation projects (Amarna, Elephantine, Tell el-Daba). In spite of the combined approach, objects are still often deemed a main source to clarify the function of a room (Masson 2008, 4; Arnold 1996, 19); similarly, the presence of certain features is often automatically linked to room function, e.g. the presence of an oven prompts the classification of that room as a kitchen.

2.1.3. Analysis of previous interpretations

As has been outlined in the previous section, the comparative analysis of floor plans and the attempts to explain any relationships between them have focused mainly on the study of house layouts.

Within these contributions, three aspects have been identified which are worth evaluating given their influence in the interpretation: the overwhelming weight given to Kahun[1] mansions and Amarna standard villas, the broad definition of the tripartite arrangement used and, at the core of both, the inclination to search for patterns that conform to conceptual ideals, notably the tripartite plan and the courtyard house.

2.1.3.1. The overwhelming weight of the Kahun and Amarna data

As seen in the previous section, Kahun mansions and Amarna standard villas have played a central role in the interpretation of ancient Egyptian house floor plans as a whole, with evidence from other sites inevitably being interpreted in relation to them. Some have deemed the Amarna standard villas as representative of a building tradition (Kemp 1977b; Arnold 1989, Spence 2004), while others have argued against this role (Lacovara 1997).

However, from a methodological point of view, the suitability of using the Kahun mansions and Amarna villas to interpret ancient Egyptian houses as a whole is at the very least questionable. First of all, in terms of absolute chronology, Kahun and Amarna are inhabited primarily within the Middle and New Kingdom periods (c. 2055-1650 BC and c. 1550-1069 BC, respectively) which in total represent approximately less than a third of Pharaonic history (c. 3200-30 BC); moreover, this temporary consideration gains more importance when we bear in mind that both sites were very short-lived and their occupancy confined to those two periods, with Kahun being inhabited in the Middle Kingdom and possibly re-inhabited in the New Kingdom (Petrie 1891, 15; Quirke 2005, 118) and Amarna's occupation lasting only fifteen years within the New Kingdom (Kemp 2010); thirdly, on the grounds that the size of Kahun houses is considerably larger than the vast majority of houses excavated thus far (for a comparison across periods in the research sample, see table 4.1). To this, the dangers of homogenising houses within each group must not be forgotten, as Kemp (1977b, 127) pointed out that the diversity in scale, room arrangements, distribution and ancillary buildings within the standard Amarna villas was 'almost infinite'.

[1] From here onwards, 'Kahun' will replace 'el-Lahun'. Kahun was the name mistakenly given to el-Lahun by Petrie; however, the use of Kahun is more common in the archaeological literature.

There are nevertheless some positive aspects to the study of these two sites, notably that their short period of occupation provides an uncluttered view of a town at a given time, as well as facilitating the collection of information regarding planning preferences.

2.1.3.2. The broad definition of the tripartite and courtyard house

Original terminology developed after Ricke's study contributed to reinforce the use of certain terms for house types, such as the 'tripartite house'. However, in order to be able to apply this term to the wider discussion and consequently analyse the role of the tripartite house in the history of ancient Egyptian domestic architecture, it is important to analyse what is implicit in the term and to what layouts it has been applied. The name 'tripartite' is given to any group of three rooms which can exist in isolation forming an entity in their own right, or feature within a larger structure, regardless of the position and relation between those rooms (see Ricke 1932, Von Pilgrim 1996, Bietak 1996b). In spite of this general definition, certain particular tripartite arrangements have been classed differently by various authors (see Von Pilgrim 1996, 190 on Bietak's group B type I).

It therefore appears that this classification is too broad to be meaningful, as the stress is put in the mere existence of three associated rooms; this allows one to classify structures as belonging to the tripartite category, which can then be taken as a unity or be divided into further sub-categories according to the particular physical relation between those three rooms (see Bietak 1996b). Despite starting from that assumption, Bietak (1996b) moved beyond the mere layout typologies, analysing the hierarchy and relations between rooms in tripartite units. However, the downside of his analysis is that the attribution of the main living space appears to be made on the basis of room size – with this space being larger than all the other rooms – and the direct accessibility from the outside or from the vestibule. All the other rooms are not primarily defined by their own function but by their relation to the main living space. Consequently, as described in the previous section, 'bedrooms' can be considered as 'adjoining rooms'. The main criticism that can be made to this approach is the reliability of the criteria used to label a room as the main living space, given that both a frontal or central position and a comparatively larger size might be questionable requirements.

On the other hand, the great variability in what can be termed as a courtyard house is manifest (Al-Azzawi 1986). For ancient Egyptian houses, the denomination 'courtyard house' is sometimes given to a central courtyard house; e.g. Arnold (1989) put the emphasis on the central piece arrangement rather than the existence of a courtyard in itself, and accordingly put the central courtyard in Kahun mansions on a level with the central hall in Amarna houses. On the other hand, courtyard houses can be defined as those containing an unroofed space, usually larger than all other rooms, regardless of its position within the floor plan (see e.g. Von Pilgrim 1996, compare Figs. 4.24, 4.27, 4.28).

While both interpretations of the courtyard have in common the predominant role that this one space plays in house distribution, they avoid considering that this role need not necessarily translate into a same floor plan type, and raise some doubts about the convenience of classing both as 'courtyard houses'. Furthermore, the existence of yards need not be restricted to a certain position or size, as will be described in the analysis of modern houses (Chapter 3, section 3.3.3.4.7), which further discourages the classification of houses according to the existence of a courtyard.

2.1.3.3. The inclination to search for formal patterns

A predominantly formal approach proves unsatisfactory for an understanding of house life, particularly when bearing in mind that domestic architecture is partially the reflection of sociocultural constructs, as explained in chapters 1 and 2. Bietak (1996) attempted to include living practicalities in the classification of tripartite houses by distinguishing between main living spaces and secondary rooms – which comprise all those which surrounded the main living space. In addition, Bietak's (1994) connection between house plans and both private chapels and temple arrangements added a human dimension to the form; however, the reasons for the choice of a tripartite arrangement remained unexplained.

The existence of this pattern in some domestic contexts in the archaeological record, chiefly in the form of three consecutive areas, of which other tripartite arrangements are considered variations, cannot be denied; nevertheless, the inclination to the identification of tripartite patterns appears to be also encouraged by the conceptual parallelism with the 'house of god' (Steindorff 1896, 108), the potential parallelisms in layout with palaces (Fig. 2.4) and the probable assumption that a residential building need have public, semi-private and private sections (Mitton and Nystuen 2007, 3).

As to the importance given to the courtyard as a typological element, early research, highly influenced by orientalism and the links with Near Eastern archaeology could have been the origin of this focus (see Document 1 of the Appendix).

2.2. Theoretical framework

In contrast to previous approaches, the aim of this research is to reconstruct a picture of ancient Egyptian houses which is not constrained by formal classifications or a rigid understanding of the study of space. Instead, it aims to focus on the relation between humans and buildings, and the manner in which this reflects on the architectural features, distribution and use of space.

Accordingly, the belief that sustains the theoretical framework of this thesis is that humans are subject to an interaction with buildings in as far as these are part of their surroundings; however, the material result of that interaction is dependent on the particular context in which the house is embedded.

The consequence of this approach is the belief that it is possible to theorise about the contextual factors which influence building, and to study how those factors affect, and are affected by, building materials.

Therefore, the theoretical framework was built upon three groups of factors: interaction, contextual and material factors, which reflect a holistic understanding of domestic architecture. This holistic understanding was translated into a methodology for the study of ancient Egyptian domestic architecture through the use of ethnoarchaeology.

2.2.1. Interaction factors

There seems to be consensus between various disciplines on the fact that human beings model the particular characteristics of the landscape in which they settle to suit their needs, through the modification of natural resources and the development of human-made structures, chiefly buildings. There is, however, disagreement concerning the specifics of the role that humans, on one hand, and buildings, on the other, play in that adaptation process.

Firstly, the degree of independence from the environment of the individuals and their ability to make choices in relation to it is subject to interpretation. Canter (1973, 216) portrayed humans as having a proactive role in their interaction with their surroundings, as they were interested in achieving an understanding of the environment in order to establish control upon it. Contrary to this view, Leatherbarrow (2002, 288) believed that individuals had a rather passive role and were heavily influenced by the environment.

Secondly, as a fundamental part of the environment, the role that buildings play in the establishment and development of the relationship between humans and their surroundings is also subject to debate. The act of building is part of the creation of a sense of place and contributes to that creation as much as natural geography (Seamon 1986, 20), to the extent that buildings are considered part of the landscape by some human groups (Nogue i Font 1993, 169). Buildings are thus part of the hierarchy into which humans categorise the environment (Nogue i Font 1993, 169). However, while some consider the buildings just as another means of adaptation to the environment (Rapoport 1976), others deem them a distinct space which requires a specific study beyond their role as an environmental adaptation tool (Amerlinck 2001). The latter believe that buildings have such a fundamental role in structuring space (Egenter 1992, 83) that they deserve to be studied independently from the rest of the environment. Amerlinck (2001, 2) maintained that architectural space was distinct from other spaces, consequently human behaviour within buildings was different from that taking place in other spaces.

Therefore, although the fact that buildings are inserted into the environment should not be undermined, the reciprocate influence between buildings and humans and the sociocultural setting in which the relationship develops, deserve to be studied individually. This sociocultural dimension is particularly evident in the house, which is affected by local group principles as well as by the work undertaken by its inhabitants and their particular roles within the community (Izikowitz 1982, 3, 5).

The private house is another expression of the ‘social space’ of the community (Mobjerg 1991). This social space can be divided into signal and symbolic (Tanner

1991). Signal space reflects the real social structure and organisation, while symbolic space usually does not refer to any physical reality, for example a space with cosmic imagery. When this space presents an idealised symbolic representation of a society by means of spatial organization, it is called iconic (Tanner 1991, 22). This implies that space is changeable depending on natural and cultural cycles, i.e. it can have a different use during day and night, or became more or less important depending on festivities (Wulff 1982, 145). Although the symbolic meanings of space have not been the object of this research, the practical consequences of changeable space are essential to analyse and interpret domestic architecture, as will be seen in Chapters 3 and 4.

Another aspect of the reciprocate influence between humans and buildings is the way in which the space is perceived and the manner in which that perception influences behaviour. The perception of colour, space, light and form around buildings, has an effect on behaviour to an unspecified degree. Colour and light affect emotion, and are therefore instrumental in creating a certain atmosphere (Mahnke 1996). Perception can even have a lasting influence in the individual's mental state (Bagley 1974, 156). The perception of forms — solids, hollows, vertical or horizontal — through the senses is a way of making sense of the physical in a mental way, by processing masses of buildings, distance between them and shape, amongst others (Arnheim 1977, 32). The perception of forms of architectural features can contribute to a sense of openness or closedness, for example, buildings feel more forbidding if they have small windows; however, windows also display a positive shape on the surface of the wall which can help towards a perception of the three-dimensional character of the building (Arnheim 1977, 226-232).

This need to organise information mentally is also evidenced in the existence of 'rhythm' in architecture, given that the human mind tends to group random phenomena into rhythmic patterns (Smith 1979, 24). A consequence of this is the creation of conventions and symbolisms which are expected to be found associated with certain spaces. This, in turn, is reflected in building design, e.g. symmetry, reiteration of certain shapes and association of some forms between them and not with others. Individuals tend to turn their physical reality into a mental one (Barbey 1985, 9). Therefore, 'a building in all its aspects is a fact of the human mind' (Arnheim 1977, 4).

Although perception is originally a physiological process, it is also socioculturally influenced. Lee (1973, 114) remarked that the environment has an effect on the individual's attitudes and behaviour, and that the invididual's perception of this environment is at the same time influenced by social and physical factors and partially dependent on a preconceived image (Appleyard 1973, 95). Honikman (1971, 24) talked about 'constructive alternativism' to define the different ways in which people interpret the environment that surrounds them. Certain human design choices are the reflection of the way we conceive our 'being in the world', not only as individuals but also with others (Harries 1993, 56-57). Subjectivity is highly involved in understanding the environment; each individual imprints his meanings and values into the environment, and consequently interprets it in a unique way (Lee 1973, 121). As Carr stated (1967, 199), in a way 'the city (and environment) is what people think it is'; therefore, the importance of the individual's perception of architecture should not be undermined.

However, the perception of a building is also attached to a certain human group and results in a series of meanings conveyed through language (Lee 1973, 122; Canter 1974, 80); such perceptions can be manipulated in order to communicate certain information concerning the people inhabiting it, or to create a certain feeling in a person approaching the building, such as exclusivity. This manipulation of perception can also be targeted to specific groups within a society.

In summary, the influence of the factors involved in the human-environment relationship is reciprocal: the needs and values of a group influence the activities which take place in a certain environment and determine its perception; in turn, the behaviour generated modifies the environment (Appleyard 1973, 92). Lee (1973, 114) highlighted that the particular characteristics of an environment determine its perceptions and vice versa, creating a two-way cyclic relationship which has an influence in spatial behaviour. Cultural signs and meanings on one hand, and functional and practical needs on the other, must be taken in equal consideration, as they are all integral parts of the individual's experience of space (Moore 1986, 191). These meanings and needs can be understood better through the practical analysis of contextual factors.

2.2.2. Contextual factors

The context in which a house is embedded is formed by a series of variables, which for this research have been identified as environmental, sociocultural, community-related and individual.

Environmental factors refer to the way in which the specific climatic and physical conditions influence the specifics of how houses are built. Geography, climate, and the particular topographic conditions of the site all contribute to the appearance and distribution of the houses. In addition, the environment is also subject to human alterations, such as the construction of canals, which modify the surroundings and therefore have an indirect effect on building characteristics.

Sociocultural aspects are arguably one of the most important contextual factors involved in housing. Social interaction is construed, amongst others, by means of the built environment, and consequently, of houses (Rapoport 1976; Kamp, 1993; Last 2006, 120); status, class, and gender are expressed through building, which at the same time is a reflection of tradition.

Whether a settlement was planned or developed organically, also plays a role, as a deliberate urban plan might result in particular types of buildings being present; in addition, the particularities of the community, for example, towns which were designed specifically for a certain group, such as workers, might also be affect the predominance of a particular type of building.

Lastly, individual preferences based on the particular circumstances, tastes and perceptions as described earlier, are also part of the context in which the house is immersed.

The study of context is an essential concept in archaeology (Cameron 2006, 22). Although ‘context’ can have several meanings, they always imply the connection of objects with their surroundings (Hodder and Hutson 2003, 171). That context in which the archaeological remains are inserted is vital to reconstruct past human activity (Renfrew and Bahn 2000, 50), as it allows for the understanding of remains (Last 2006, 120; Barrett 2006, 194). Ethnoarchaeology facilitates the reconstruction of that context by analysing the environment, sociocultural aspects, community and individual related aspects, through the study of available sources, architectural surveys, interviews and observation, as will be detailed in the 'methodology' section of this chapter.

2.2.3. Material factors

As already explained, material and context influence each other, and this influence is particularly visible in relation to environmental and sociocultural variables. Building materials are linked to the environment, given that the surroundings determine material availability and climate suitability. In addition, material choices are also influenced by practical choices related to cost, flexibility and durability. Moreover, social and cultural factors unrelated to practical aspects can also be a prime reason for certain choices of material, independent from their suitability.

All of these factors must be taken into account in a study of domestic architecture. In addition, the physical properties of the material should also be evaluated; a consideration of building techniques is also crucial to understand the buildings.

For this reason, it is an essential part of any methodology researching mud-brick houses to employ checklists, surveys and drawings to record materials, construction techniques and structural elements consistently, as well as house layout and room distribution. The way in which the material affects the development of the building throughout time can then be studied.

Consequently, a methodology for the study of ancient Egyptian domestic architecture needs to acknowledge the importance of the reciprocate relationship between humans and buildings, and the way that this relationship reflects on the material form of the house, thus facilitating a synchronic and diachronic analysis (Amerlinck 2001, 3). With these aims in mind, the following methodology has been developed.

2.3. Methodology

2.3.1. Main objective: an ethnoarchaeological study

The previous section has highlighted that context and material are two fundamental aspects in the study of domestic architecture. Ethnoarchaeology has consequently been identified as the fundamental tool for the reconstruction of this context and its links with materiality, as its main aim is to re-establish the link between material culture and cultural context as a whole (David and Kramer 2001, 2); a fundamental assumption of this study is therefore that buildings are a particular domain of material culture (Tilley *et al* 2006, 1, 4). Another fundamental issue that stems from the use of ethnoarchaeology for the study of ancient Egyptian domestic architecture is that ethnoarchaeology relies upon abstractions about the way in which humans relate to buildings, both in general and within a number of contextual variables, all of which have been explained in section 2.2.

The use of ethnoarchaeology for the study of material culture has proved to be a very useful tool for Egyptologists, as exemplified by the works of Nicholson and Patterson on pottery making (1985) and Wendrich on basketry (1999). Nicholson and Patterson studied pottery making and workshops in Deir el-Gharbi, Upper Egypt, with the purpose of explaining how these industries could be reflected in the archaeological record. The emphasis was not only on the technological, but also on the cultural and economic aspects of the industry (Nicholson and Patterson 1985, 224). This study provided a great deal of information about the technical aspects of the pottery industry in the area, while revealing important details for the interpretation of the archaeological record, for example, which working areas were more likely to leave traces of activity. Nicholson (1995) also applied this method to the study of pottery in Deir Mawas, Middle Egypt. Likewise, after several studies, Wendrich concluded that Middle Kingdom basketry in Middle Egypt bore more in common with that of the same area nowadays than it did with ancient basketry from Nubia (Wendrich, 1999).

This approach has, therefore, proved to be a fruitful one; however, it has never been applied to a study of Egyptian mud brick structures. Nevertheless, ethnoarchaeology is fit for the study of domestic architecture as it allows the development of analogies (Lane 2006, 402) which can help understand the reciprocate relationship between humans and buildings. Similarly, it acknowledges that buildings, as material culture, reflect human activities and intentions, but that these are also restricted or promoted by the buildings in which they take place (Lane 2006, 404).

Therefore, the use of ethnoarchaeology provides, on one hand, a theoretical analysis of the influence and proportion of contextual aspects in house materiality; on the other hand, it informs practical aspects concerning the building material, its properties and construction; lastly, it enlightens the relationship between the two, a fundamental link for the understanding of domestic architecture which is most often lost in the archaeological record.

2.3.2. Methods in relation to objectives

This section describes the methods of data collection, analysis and interpretation in relation to the aims and objectives described in section 1.2.

2.3.2.1. Sub-aim 1

Sub-aim 1 was to achieve a theoretical understanding of factors potentially influencing domestic architecture, with relation to interaction, contextual and material factors. This was to be achieved through the compilation of information regarding process which might have influenced Egyptian mudbrick houses in the last century, as well as through interviews and observation (objective 1).

The collection of data concerned with the processes affecting houses in the late 19th and throughout the 20th century focused on studies across the century regarding land ownership, rural life and agriculture studies, economic geography, geology and general history of Egypt and their analysis forms the first section of chapter 3. The time frame was determined by the fact that it is only from then that we have substantial information about mudbrick houses in rural Egypt.

Through the analysis of these studies, a combination of the contextual factors which which might have had an impact on the distribution and physical appearance of mudbrick houses was identified: environmental factors, caused by the importance of the river Nile and the human modifications made to it through the construction of dam and irrigation improvements; sociocultural factors, through the identification of certain construction materials, namely red brick and concrete, with prestige and status; community-related factors, with some communities having to abandon their houses due to the building of dams; lastly, individual factors, with households composition changing throughout time. This data served, therefore, to validate the various levels proposed as forming part of the contextual factors, as well as to produce a theoretical understanding of the manner in which those levels can affect the physical form of the house.

2.3.2.2. Sub-aim 2

Sub-aim 2 aimed to increase the knowledge about the construction process, the characteristics and the development of modern mudbrick houses in order to gain a better understanding of the physical aspects of the archaeological remains. This was to be achieved through architectural surveys and observations in the Delta and the Nile valley, as well as the compilation of information previously published for these areas and for the Dakhleh Oasis (objective 2).

2.3.2.2.1. Modern data sources and their scope (Fig. 2.8)

2.3.2.2.1.1. Lower Egypt

Data for Lower Egypt was collected through fieldwork undertaken in 2009 in the governorates of Kafr el Sheikh (Shabas el-Shuhada and Shabas Ummayir) and Gharbeya (Kom el- Abiad, Kom el Naggar, Najrij, Sa el-Hagar, Hissat Abbar, Surad, Kom Surad and Birma). Information for the governorates of Menoufiya, Dakahliya, Sharquiya, Beheira and Qalyubiya, in addition to further information about the two previously mentioned areas, was obtained from the publication 'L'habitat rurale d'Égypte' (vol.1: Lower Egypt) (Lozach and Hug, 1930).

The vast majority of mudbrick houses in the northwest Delta have been replaced by red brick and concrete alternatives. In each location, only a very small proportion of houses were constructed of mud, and in some villages only one example of a mud house could be found. These were normally isolated units amongst concrete/red brick buildings and, in most cases, they were in a state of disrepair.

The locations for fieldwork were primarily selected following geographical criteria but also bearing in mind any distinct cultural aspects, e.g. Birma was chosen because of the particularity of being home to the largest Christian community in the area. The selection of those villages which included the word "Kom" as part of their names was based on the allusion to their location on a mound, where preservation of the old town is more likely to occur. Surveys, building feature checklists, observations and interviews were carried out in Kom el-Abiad, Kom el Naggar, Najrij, Sa el-Hagar, Hissat Abbar, and Surad; checklists, observations and interviews in Kom Surad and checklists and observations in Birma, Shabas el-Shuhada and Shabas Ummayir.

The second source of data for the Delta is the publication by J. Lozach and G. Hug, who were commissioned by the Royal Geographical Society to undertake a survey of rural settlements across Egypt. Questionnaires in French, English and Arabic were sent out to the administrative authorities in each area, with the aim of collecting data about rural settlements and the geographical, economic, political and ethnic factors influencing them (Lozach and Hug 1930, viii). The text of this questionnaire was published in Bulletin de la Société Royale de Géographie (1927, 118-124; Appendix Document 3). The subsequent information was compiled into two books, one for Lower Egypt, which Lozach was in charge of synthesising and interpreting, and one for Middle and Upper Egypt and the Fayum, compiled by Hug. In the case of Lower Egypt, the resource is invaluable in offering an overview of the building traditions and materials in each area and no other such thorough attempt to record the rural buildings of the Nile Delta has ever been made. Moreover, the fact that exactly the same questionnaires were distributed to all areas — and indeed to Middle and Upper Egypt — facilitated the data synthesis in terms of a comparative approach. However, it must be taken into account that the questionnaires were sent out through administrative channels to 'all environments capable of responding with competence' (Lozach and Hug 1930, viii), as opposed to this information being collected directly in the field by the authors, which made it more susceptible to being manipulated. In addition, the subjectivity of some of the questions asked should be born in mind (see Document 3, block 1, question 6). The criteria used to establish a house typology must be also used with caution, as Lozach's interpretation placed a high emphasis on the economic status of the owners; this could have implied the inclusion of prejudices and assumptions, resulting in a simplistic analysis.

In spite of this, the fact that further information about the governorates of Kafr el Sheikh and Gharbeya in particular was obtained from fieldwork, is a tool to assess the reliability of this source. The vast majority of the information obtained overlaps with that collected by Lozach for the area as a whole; in addition, one of the main processes affecting the Nile Delta recorded through fieldwork, namely the progressive disappearance of mud houses and their replacement by red brick alternatives, was already noted by Lozach (1930, 27). The differences with the information obtained during fieldwork could be at least partially explained by the changes or disappearance of certain characteristics and the permanence of others throughout the 20th century.

The strength of the data, obtained through fieldwork, was that it was first-hand, up-to-date information. Through the use of checklists (Appendix Document 6), a large amount of general details was recorded very quickly, and a comparison of exterior finishes (roofs, walls, windows, doors and features) was facilitated. In addition, complete surveys of selected buildings were undertaken, which provided information concerning building planning and space distribution, as well as easily comparable details about internal finishes. Time constraints meant that the sample of collected data regarding internal finishes was not as broad as that of external finishes. However, the survey and observation information was complemented with oral information obtained through interviews with the inhabitants of the house, which enriched the quality of the data. The fact that the interviewer was a stranger to the community and the risk of inaccuracies related to translation must be taken into account; however, translations were checked again with a native Arabic speaker on return from fieldwork. While Lozach's method of data collection avoided the language problem, there was also a higher degree of interference from third parties, namely the heads of villages, in charge of distributing and collecting the information in the field.

Overall, the two sources of data complement each other: while Lozach's survey brought in a very broad sample of information about both internal and external details, it was poor in detailed plans and oral information. The fieldwork undertaken as part of this research, therefore, provided this data, although for a much smaller sample.

2.3.2.2.1.2. Upper Egypt

The data collected through fieldwork in Upper Egypt focused on the governorates of Luxor and Qena, with information being obtained both from fieldwork and published/unpublished sources.

Firstly, the historical and archaeological circumstances surrounding Qurna meant that mudbrick houses have not only been the traditional architecture of the place, but also a symbol of community identity and cohesion. Throughout its history, Qurna was subject to numerous relocations due to the fact that its houses were built on top of ancient Egyptian tombs. The first serious attempt to relocate the population away from the antiquities was made in the 1940s. Hassan Fathy's team, which was commissioned to build New Qurna for this purpose, surveyed in excess of 70 houses before they were destroyed. These surveys are kept in the Rare Books and Special Collections Library at the American University in Cairo (RBSCL – AUC). While the floor plans were drawn quickly and without detailing exact dimensions and location, the notes included in the survey provided detailed descriptions of rooms and the spatial arrangement within the houses. This complemented the information obtained through fieldwork in 2009, where a good amount of detail about external finishes in remaining Qurnawi houses was obtained through observation, but collection of information about interiors was not feasible. Another source, offering a thorough description of the phases of a particular house, was found in Castel's (1984) article detailing the evolution of the house of the Abd-el Samad family in Qurnet Marei throughout several decades. Although this is only one example and no comparison with other neighbouring houses is provided, it presents a very detailed account of the house since its construction and of its evolution throughout several generations, including changes and modifications of features and distribution through time.

So far as the Qena region is concerned, information regarding external finishes of houses in Naqada was obtained both through fieldwork and Hassan Fathy's architectural survey of Naqada houses (RBSCL-AUC), as well as exclusively through fieldwork in Hu, Shenhur, Dendera and Qift. The information obtained by fieldwork in this research was limited with regards internal finishes as well as oral sources; however, this was complemented by Hassan Fathy's surveys as well as the house plans and social information obtained through other studies, such as the one carried out at Mari Girgis by Henein (1988) which dealt with the domestic architecture of that village as part of a comprehensive ethnological study of its community.

2.3.2.2.1.3. Dakhleh Oasis

The data for this area comes from published sources, as data collection through fieldwork was not possible. A multidisciplinary project was set up in the late 1970s to study the whole of the Dakhleh Oasis between 5000 BC and 500 AD, with the aim of shedding light on the environmental and cultural characteristics and evolution of the area, as well as its relation with other areas and the external factors influencing it (Churcher and Mills 1999, ix). Within this context and with the aim of improving the conservation of ancient architectural remains, a Training and Conservation Centre was developed in the village of al-Qasr. The construction was made in a vernacular style, and, for this a study of modern mudbrick houses in the area was carried out by Schijns (2008), which included general building characteristics of al-Qasr as well as a description of external and internal features, spatial arrangements of some houses, and detailed plans and sections of those houses. In addition, a study about the technological and typological characteristics of mudbrick houses in the settlements of Balat and al-Qasr was carried out by de Filippi (2006) as part of the research project 'Learning from tradition: improving and implementing sustainable building methods and techniques oriented to conservation of indigenous architecture in the New Valley region' (Politecnico di Torino - Asyut University). Lastly, Hivernel (1996) published a volume on an ethnologic study of Balat which also included some considerations concerning domestic architecture materials.

2.3.2.2.2. Methods of data collection

On arrival to each location, accompanied by the police and the corresponding Supreme Council of Antiquities (SCA) inspector, a visit was paid to the local authorities to inform them of our presence. They then normally helped identify the areas where mud houses could still be found and acted as a point of contact with the inhabitants of those houses where relevant information could potentially be found.

In the vast majority of instances, access to the property was granted by its owners. When not granted, this was due to concerns regarding privacy and the use that would be given to the information, despite reassurance that the data collection only had educational purposes.

Time constraints, as well as availability, meant that only one or two properties could be fully surveyed in each location. In these cases, once access was granted by the inhabitants, a comprehensive survey was undertaken, selected sections and elevations drawn and interviews carried out. Numerous pictures were taken and relevant details recorded. For all other properties, pictures were taken but details were recorded through the use of the 'building features' checklist.

2.3.2.2.2.1. Interviews [2]

Developing interviews as part of the methodology was essential because much information about construction and building techniques is passed from generation to generation orally, as well as culturally transmitted (for example, data about the use of space), showing the importance of tradition. Although interviews were chosen because they provide in-depth data, they had to be complemented with observations so as to make the information more objective.

The interviews developed as part of this methodology were semi-structured: they were scheduled and planned but open to explanations that the participants might have wanted to give, with the aim of collecting as much information as possible. Information about a certain number of key aspects for the study was required and guided the content of the interview but, at the same time, there was an interest in collecting other pieces of information that might have not been considered and that might arise while the participants were answering the questions.

The questions were structured in a way that facilitated a response as concrete as possible from the participant, making it possible to obtain specific information about certain aspects of the inhabitants' experience; in addition, they aimed to be phrased in a way that minimised the possibilities of misunderstandings.

The specific questions were not shown in advance, since they were not deemed to need preparation: most of them were related to practical aspects of everyday life in Egyptian mudbrick houses. Nonetheless, the general lines of the questions that would be asked were communicated to the participants via the translator.

The groups of interest were builders and ordinary owners, especially those that undertook repair and maintenance, such as women. It was expected that these two groups might provide abundant and diverse information about the process of building, which could be compared later. The individuals who would participate in the process were those who were willing to give information and provide access to their houses. The advantage of interviewing ordinary owners as well as builders was that the former could provide information about the factual use of rooms, while the latter were more likely to concentrate on their intended function. In practice, it

[2] The development of a rationale for the interviews benefited greatly from the Durham University Graduate School courses 'Interviews I' and 'Interviews II'.

proved difficult to find mudbrick masons, and the interviews were almost exclusively restricted to house owners, both men and women.

Before carrying out the interviews, it was necessary to identify the 'gatekeepers' (individuals who might hinder access to the information), who, in this case, could be present within three different groups: the authorities, who, on arrival to the village, could oppose us talking to certain people, for example, individuals that might report negative opinions about them; secondly, the builders, who could be protective of their knowledge, since it was the basis of their work and of their role in the community; thirdly, the villagers themselves could be reluctant to release information about their own activities within the houses, for example, for fear of it affecting their status within the community in some way.

Prior to the interviews, participants were provided with a summary of the project detailing the way in which the information was going to be used, together with reassurance about confidentiality (see Appendix, document 4). This information was provided in writing in English and Arabic and also explained by the translator, to allow for the inclusion of illiterate participants. Participants were informed that the research activity was part of a PhD thesis and would have no further correlation with any possible action at institutional level, due to the scope and financial means of the research. It was pointed out that, nevertheless, the study would be a document accessible from libraries.

For the development of these interviews, the codes of conduct used were that of Durham University (Ethics and Data Protection Monitoring Form) together with the Codes of Practice of the European Association of Archaeologists (EAA 2009) and the Institute for Field Archaeologists (IfA 2010).

Demographic information did not need to be collected, thus participants were not chosen with any particular age criteria; however, it was deemed beneficial to include older participants who were more likely to provide information about traditional ways of building, i.e. people over forty years old.

Interviews were recorded with the permission of the participants. This was done in order to allow more flexibility when asking questions or clarification through the translator. It was planned that, in cases where participants refused to participate in recorded interviews, answers would be written down; however, this was not necessary as all participants agreed to have their interviews recorded.

Before starting the questions, the aforementioned introduction about aims and intentions, confidentiality issues and use of information took place, followed by introductory questions to set up the scene for the interview. According to Kvale (2007, 56) the questions should be easily understandable, concise and adapted to the interviewee's language level. The structure of the interview should promote communication and provide a comfortable environment for the interviewee to express himself.

With the aim of obtaining the relevant information and, bearing in mind both the interview design recommendations, and ethical considerations regarding the participants, a set of interviews was developed (Appendix, Document 5).

2.3.2.2.2.2. Observation

The observation carried out in each village was divided into two different levels, to allow for the recording of both house characteristics which might be common to all village houses, and those specific to individual houses.

Firstly, a general observation of the village houses was undertaken on arrival to the village, in order to annotate as many characteristics as possible about building features; for this purpose, a checklist was developed prior to fieldwork (see Appendix, Document 6). Each house was assigned a code, which was formed by the first three letters of the village in which it was located, plus a two digit number, e.g. Surad, house number 4, was assigned the code SUR04. In the cases where the names of the villages started with the word 'Kom', the first letter of each word was used instead, e.g. Kom el Naggar, house number 3, was assigned the code KEN03. The house was classified according to the characteristics of the building unit, number of floors and the presence or not of associated land. The main elements of each building were also recorded: foundations, structure, walls, openings, roof, ventilation/extraction and access; a series of options was provided for each feature so that it was possible to collect a substantial amount of information about each aspect quickly.

Secondly, observation of specific houses was carried out in those properties surveyed after obtaining the relevant consent. This observation was centred on both architectural elements and people's behaviour within the house.

The aim of the observation was to provide information about the way in which the space was distributed and its actual use by the inhabitants of the house. Special attention was paid to the different activities carried out in open-air spaces such as courtyards, in which there exists a high risk of interference between activities.

Observation of size, shape and mass of organic furniture (containers, ovens) was also undertaken in order to provide clues about information that might have not been released by other means (Lee 2000, 30).

2.3.2.2.2.3. Surveys

Buildings were measured with a laser tape (for ceilings) and an ordinary tape measure and preliminary plans produced. Inside the houses, particular attention was paid to differences in room dimensions, height of ceilings, thickness of walls, dimension of windows and openings (i.e. doorways), location of stairs and difference in floors (if existent). Externally, the curvature of the walls (if existent) was also measured.

2.3.2.2.2.4. Photography

A substantial amount of photographs was taken to document the different structures and support the information obtained through the surveys. These photographs form the vast majority of the illustrations in Chapter 3.

2.3.2.3. Sub-aim 3

Sub-aim 3 was to apply the knowledge regarding contextual factors and material properties towards a comprehensive understanding of modern mudbrick houses in each one of the chosen areas. This was to be achieved through the description of the impact of the particular contextual and material relations in architectural features, distribution and use of space in modern houses (objective 3).

The methods corresponding to this objective are methods of data analysis, based on the collection of information undertaken as part of objective 2.

The qualitative analysis of data must be subject to 'data reduction' (Miles and Huberman 1994, 10), which is the process of simplifying, summarising and restructuring the data collected during fieldwork. The information that was collected regarding the material factors (description of materiality of architectural features, and distribution and use of space) was 'reduced' by restructuring it to fit ordinary categories used in architectural description, namely a general division between external and internal finishes, with external finishes being subdivided into: roofs, walls, doors, windows and features; and internal finishes were divided into ceilings, walls, doors, windows and others (Fig 3.2). The way of presenting the information was, for each one of these elements, to describe the materials used and then to explain the variations found. This process of data analysis was repeated for each one of the three areas (Lower Egypt, Upper Egypt and Dakhleh Oasis) in order to facilitate summarising and comparison between areas. Once each one of the three areas was described, the information was synthesised and presented as a comparative summary between areas featuring each one of the external and internal finishes described.

Concerning the distribution and use of space, the synthesis of the data was done through the identification of the main activities which were commonly found across the sample and through the literature examined; these were: storage, animal areas, cooking, sleeping, social interaction and others; the first three are areas of particular archaeological relevance. These activity areas were described for each of the three geographical areas, Lower Egypt, Upper Egypt and Dakhleh Oasis. After, in a similar process to that undertaken with the architectural features, the similarities and differences between the three areas for each type of activity were synthesised, focusing on roofing, access and room position. The aim of this focus was to identify possible areas that could hold another storey above, as well as pinpointing potentially recurrent associations between rooms, both relevant aspects from an archaeological point of view.

The analysis of the distribution and use of space focused on other aspects that are difficult to understand through the archaeological record, such as the use of open spaces and the use of second storeys in buildings where available.

This analysis and synthesis of material regarding architectural features and distribution and use of space can be found in Chapter 3.

There was no need to transcribe the totality of the interviews as the information was extracted and processed comparatively with that of the other locations; nevertheless, the original recordings of the interviews are available in the accompanying CD. Because the variety of answers was high, it was difficult to establish patterns in the information, as it is usually recommended for the analysis of interviews (Miles and Huberman 1994, 246-248). Nevertheless, the interviews were used to complement the information obtained through observations and surveys. This also complied with the view that the analysis of interviews should combine the subject's own understanding of the topics discussed, together with new perspectives added to it by the researcher (Kvale 2007, 102). In this case, the combination of interviews, observation and surveys allowed for the inclusion of these two viewpoints.

The analysis of the surveys was made through the production of sections and plans (AutoCad drawings). Once all the drawings were in the same format it was possible to analyse any possible similarities in floor plans.

2.3.2.4. Sub-aim 4

Sub-aim 4 was to examine a series of archaeological sites in light of the result of the study of modern mudbrick houses, in order to show the potential of this approach. This was to be achieved through the application of the method developed for the analysis of mudbrick houses to a series of archaeological house remains, with the purpose of investigating their context and material (objective 4).

2.3.2.4.1. Archaeological data

When selecting the archaeological data to be analysed, several criteria were used bearing in mind that the main aim was to test the methodology synchronically and diachronically. Firstly, the intention was to select sites for each period of Pharaonic history, between 2686 and 664 BC. The two final periods of Pharaonic history, the Late and Ptolemaic periods (664-30 BC), were excluded as differences in archaeological remains and artistic representations suggest that domestic architecture might have been substantially influenced by external traditions during this time (see e.g. Karanis (Gazda 2004)). In any case, the quantity of sites in each period is a reflection of the existence of data and of its quality. The analysis of the sites was organised by historical period, from the Old Kingdom (2686-2160 BC) to the Third Intermediate Period (1069-664 BC). There was an awareness that this classification was not totally satisfactory, given that certain sites at the beginning or the end of such periods would bear more in common with the previous or following period than with the one to which they chronologically belonged. In addition, the chronology of certain periods is imprecise and subject to debate, particularly in relation to regional cultural differences or similarities. In spite of these problems and conscious of their limitations, the traditional period division was kept for the purpose of clarity and to facilitate cross-referencing with the archaeological literature of the sites.

Secondly, when choosing archaeological sites, rather than focusing on the usual geopolitical division of Lower and Upper Egypt, the emphasis was put on the particular environmental conditions of the sites, namely Nile Delta or valley settlements, thus providing tools for further exploring environment as a contextual factor. Nevertheless, although the intention was to include sites with different environmental conditions (i.e. Delta or valley) for each period, the natural bias of the data made this unviable, given that many more sites have been preserved in the valley than they have in the Delta.

With all those considerations in mind, a table of sites to be analysed was produced (Fig. 2.9; Fig. 2.10 indicates the sites' geographical location).

2.3.2.4.2. Methods of data analysis

The methodology developed for modern houses was applied to each archaeological site, analysing each group of houses in relation to their context and the material found in them. The context included the consideration of the factors identified: environmental, sociocultural, community and individual; for practical purposes and to avoid repetition, the historical environmental conditions in the Nile Delta and valley were described generally; then, for each site, the analysis was divided into 'environmental conditions, 'sociocultural considerations', 'community circumstances' and 'individual circumstances' (where recognisable), thus covering the contextual levels described throughout. Then, the architectural features were described, using the same division as was used for the modern material: external and internal finishes, each one of them divided into the further categories described in section 2.3.2.3, highlighting possible signs of individual factors were available. These features were summarised in tables for the purposes of an easy comparison and quick relation between them (see tables 4.1 to 4.11). Then, a comparative analysis of each feature was made, synthesising the information from all sites and highlighting the similarities and differences between them.

The distribution and use of space was analysed throughout each settlement, and the information organised in a series of tables summarising those aspects for quick comparison and reference, which can be found in tables 4.12 to 4.24. For the study of the size and shape of the proposed sample, the net room and total areas of all properties were calculated; then the house areas were divided into four categories to facilitate comparison: less than $50m^2$, $50\text{-}100m^2$, $100\text{-}200m^2$ and over $200m^2$. The areas were shown together in a table for comparison between them and in relation to the total residential area of each site (table 4.25); following that, that same information was re-organised in tables (4.26 to 4.29), which were produced in order to explore possible relations dependent on contextual factors: environmental considerations, social considerations and planned vs. organic settlements (community circumstances). Chronological considerations were then added, given the role that these played in previous archaeological interpretations of ancient Egyptian domestic architecture, as well as the diachronic character of the study.

The use of space was analysed using the same categories as those developed for the modern sample, storage, animal keeping, cooking, sleeping, social interaction and others. Any evidence of these activities found in each site was compiled and the evidence analysed in view of the results of the modern sample.

2.3.2.5. Sub-aim 5

Sub-aim 5 was to articulate the developed tools into a methodology for the study of ancient Egyptian domestic architecture and to develop guidelines for future work.

This was to be achieved through a checklist that can be used for the interpretation of house remains to be excavated and the identification of the areas where future work could be undertaken (objective 5).

The information obtained through completion of the previous objectives was interpreted and a rationale developed for future interpretation. The method for interpretation was based on the synthesis of all the analyses made throughout the research, which were summarised as: an identification of the contextual factors and their possible variables, the abstraction of those factors which were likely to translate into specific material features and the analysis of their influence in distribution and use of space. This resulted in the production of an interpretative tool showing likely correlations between contextual factors and materiality, which can serve for standardisation in future excavations, be used as a quick reference tool, and aid with the interpretations of archaeological remains.

2.4. Conclusion

This chapter has explained the theoretical framework that informs the research and consequently its methodology, by describing the three pillars which sustain it: the consideration of interaction factors, the investigation of contextual factors and the analysis of material factors. It has then detailed the methods of modern and ancient data collection, analysis and interpretation that were developed in order to fulfil the main aim, as well as each one of the sub-aims and objectives.

Consequently, chapter 2 has explained the theoretical framework and methodology behind the analysis of modern houses, which will be detailed in chapter 3.

Chapter 3: Analysis of modern mudbrick houses

3.0. Introduction

Chapter 2 explained the theoretical framework that informs the research and the manner in which it has influenced the methodology. It also detailed the methods that would be employed in order to fulfil the aims and objectives outlined in chapter 1, including the main objective of undertaking an ethnoarchaeological study of Egyptian mudbrick houses (Chapters 3 and 4).

Chapter 3 will show the application of such methods to the data collection, analysis and interpretation of Egyptian modern mudbrick houses, as the basis of the ethnoarchaeological study of ancient Egyptian houses. Two of the three factors identified in Chapter 2 as relevant to the study of domestic architecture, contextual and material factors, will be analysed for the data set proposed (detailed in section 2.3.2.2.1. of Chapter 2), while consideration of the universal interaction factors will permeate the analysis throughout.

Accordingly, Chapter 3 is divided into three sections:

The 'Contextual background' section will analyse the factors which might have influenced the distribution and appearance of mudbrick houses in different areas of Egypt since the end of the 19th century and throughout the 20th century; this analysis will show the influence of the different contextual levels described in chapter 2, namely environmental, sociocultural, community and individual factors. The archaeological relevance of this section is the achievement of a theoretical understanding of the type of factors that may influence the general physical characteristics of mudbrick domestic architecture.

The 'Material and features' section will describe each external and internal architectural feature; material, construction technique and different types where present. The aim of this section is to examine the reasons for the recurrence of features in certain areas and look for possible similarities and differences between areas, information which is often hard to infer from the archaeological record.

The 'Distribution and use of space' section will analyse the manner in which contextual and material factors influence the distribution and use of space within modern Egyptian mudbrick houses. It will explore the possible existence of local and general patterns in house plans, something which forms the basis of numerous interpretations of ancient Egyptian domestic architecture.

Finally, the 'Conclusion' will discuss the conclusions of each of the three sections above to reflect on the relations between the various contextual levels and the structure, distribution and use of space of modern mudbrick houses. Following that, a summary of factors which are likely to have an effect on the physical characteristics of mudbrick houses will be propounded.

3.1. Contextual background

3.1.0. Introduction

The aim of this section is to provide a recent historical context for mudbrick houses in Egypt by explaining the social, political and environmental factors that have had an influence on them since the late 19th century, which might help to explain the current occurrence, state of preservation, distribution and characteristics of such houses. It seeks to identify and understand the range of factors that can have an influence in domestic architecture and the particular physical characteristics that these factors engender.

From the reign of Mohammed Ali (1805-1848), Egypt experienced a series of political and economic changes, which had a deep impact on the life of the Egyptians, most particularly those living in rural areas. Changes in the traditional mudbrick architecture – preserved mainly in the countryside – were part of those transformations.

The main political and economic processes occurring in Egypt during the late 19th and early 20th century which directly or indirectly might have had an effect on rural housing began in the colonial era and continued through the proclamation of the republic with the subsequent governments of Nasser (1956-1970), Sadat (1970-1981) and Mubarak (1981 – 2011).

3.1.2. The damming of the Nile and the introduction of all-year-round crops

Arguably, the most influential of the developments in rural Egypt's life were the successive attempts at damming the Nile, which transformed agriculture, and consequently affected rural life as a whole.

For most of Egyptian history, since ancient times, the agricultural cycle relied on the yearly natural flooding of the Nile (Ibrahim and Ibrahim 2003, 73). The Nile lent itself to the creation of large irrigation basins, which acted as dams and kept the river away from the lower parts of the alluvial plain. The flood inundated this plain every year, then retreated having saturated the land and leaving some water behind (Ibrahim and Ibrahim 2003, 74). Not long after the flood receded, crops were planted (Ibrahim and Ibrahim 2003, 73). Already in Pharaonic times this natural system was improved with the construction of canals and dykes, and later enhanced by devices used to lift water, such as the *sakya* or water wheel (Ibrahim and Ibrahim 2003, 74).

Soil fertility was maintained through this natural process. The dry weather caused the land to crack, thus preparing it for cultivation (Demangeon 1926, 156). During the flood, water highly rich in salts soaked the soil. When the flood receded, the water evaporated, leaving the land surface and cracks covered in salts (Demangeon 1926, 157). When the flood came again, the salts dissolved in a much larger volume of water and drained through the capillary canals as the river flood receded. Consequently, a process of natural desalinisation took place.

As well as allowing desalinisation, the cracks helped oxygenate the land, making it more porous both horizontally and vertically, so that ploughing was not really essential for cultivation. The volume of air in the soil used to increase by 35-45% during the fallow period (Demangeon 1926, 157). Another advantage of these cracks was that, under the effect of the hot weather, the surface minerals changed, exposing the water inside the soil to a richer combination of mineral substances (Ibrahim and Ibrahim 2003, 74). Equally, bacteria helped with the nitrification of the soil (Demangeon 1926, 157).

This natural process was accompanied by a rotation of crops which required little supervision, such as a biannual rotation of cereals/flax and beans. The latter provided enough nitrogen for the cultivation of the former (Demangeon 1926, 158).

However, this historical system only allowed for seasonal cultivation. In contrast, Mohammed Ali (1805-1848) started out a modernisation of the country which included changes to irrigation. This process was accelerated later by external factors, such as the increasing English demand for cotton due to the fall in American supply during their civil war, which motivated the building of the first Delta barrages, completed in 1861. Since early in the 20th century, the growth in population also called for measures to increase the food production of the country. However, the introduction of all-year-round crops – such as *berseem* (Egyptian clover), maize and sugar cane – required an appropriate system of permanent irrigation. For this, raising the Nile's water level and allowing it to flow into the upstream canals was necessary, and this was to be achieved by damming the Nile. The most important attempts to dam the Nile in the first half of the 20th century were: the Aswan dam (1902), the Asyut dam (1902), the Sifta dam (1902), the Isna Dam (1909) and the Nag'-Hammadi Dam (1930) (Ibrahim 1982, 63). Thanks to these dams, permanent irrigation in 82.2% of land became a reality. In Middle and Upper Egypt, this constituted 5/6 of the total arable land (Ibrahim and Ibrahim 2003, 75). Consequently, by the early 1920s, the old system of basin irrigation had practically disappeared in Lower Egypt and was starting to do so in Middle Egypt, although it was fully maintained in Upper Egypt (Demangeon 1926, 159). A rotation system of new crops was introduced based on *berseem*, cotton and maize, which could be used respectively for the beasts, for trading and for feeding the *fellahin* (peasants). In addition, *berseem* also served to produce nitrogen for the soil and for manure, although chemical fertilisers became increasingly common (Demangeon 1926, 160). However, the reduction or supression of the fallow land led to changes in the fertility of the soil (Demangeon 1926, 158).

The final step towards country-wide permanent irrigation was the construction of the High Aswan dam, completed in 1971. The dam also constituted a political statement; by doubling the amount of usable agricultural land and providing hydroelectric energy, it was to become the symbol of the powerful, new state led by Nasser which had just achieved its independence, a keystone in the modernisation of Egypt

(Ibrahim and Ibrahim 2003, 112). The advantage of this dam over the previous Aswan dam was that the water was stored over a year rather than seasonally, thus decreasing fluctuations in the amount of water available over several years. The reservoir created was only partially in Egyptian territory, and was given the name of Lake Nasser, also called Es-Saad el-Ali Lake in recent years (Ibrahim and Ibrahim 2003, 76). Through the 7.5 billion m^3 that were to be obtained, the intention was to put into use 22% more agricultural land. In addition, summer crops, which needed to be irrigated while the Nile level was low, could now be cultivated (Ibrahim and Ibrahim 2003, 77).

An important consequence of the building of the High Aswan dam was the end of natural salinisation, something which had not happened with previous dams, and the consequent accumulation of salt in Lake Nasser (Ibrahim 1982, 63). The lack of silt caused an increase in lateral erosion in the river banks, wearing away the peninsulas of the Damietta and Rosetta estuaries (Ibrahim 1982, 64). The process of natural desalinisation was also altered and the amount of salt actually increased through the use of chemical fertilisers, which were now necessary to compensate the loss of natural nutrients (Ibrahim 1982, 65). Furthermore, incorrect use rendered these fertilisers ineffective or harmful (Ibrahim and Ibrahim 2003, 82). The fertiliser industry might in fact have consumed a great deal of the hydroelectric power produced by the dam in the years after its construction (Cowen 2009). The salt content of soils was also made worse by the increase in the cultivation of crops that required large amounts of water, excessive irrigation, lack of adequate drainage structures for permanent irrigation and water seepage from land reclamation projects on the higher Nile terrace (Ibrahim 2003, 83).

In addition, the High dam stopped the high fluctuation of the Nile flow, altering the pattern of ground water and drainage in the Nile valley without an equivalent change in land use methods (Ibrahim 1982, 61). The constant rise and evaporation of groundwater increased salinity and decreased productivity, while the lowering of the cultivation soil hindered drainage even further (Ibrahim 1982, 66).

Land reclamation was intended to take place in parallel to the damming of the Nile; however, the soil condition in reclaimed areas of the desert was not as suitable as that of the alluvial plains in the valley, hence more fertiliser was needed and projects failed to be cost-effective (Ibrahim and Ibrahim 2003, 78). In fact, during the first fifteen years after the construction of the dam the total area of reclaimed land did not increase. In addition, a high proportion of the land was not ultimately cultivated. Although there is a significant lack of information regarding whether the dam actually ever helped increase Egypt's food supplies (Ibrahim and Ibrahim 2003, 78), the extremely high population growth appears to have overshadowed any success achieved by the dam and Egypt had to start importing food from 1975. In spite of all this, the dam had some positive effects, such as preventing Egypt from being affected by the drought years of 1968 and the consequent droughts in Sahelian countries during the 1970s and 1980s (Cowen 2009).

The changes caused in the environmental conditions and the land cultivation system after the damming of the Nile had both a direct and an indirect effect in the decline of mudbrick architecture. Firstly, houses built prior to the High Aswan dam started to collapse due to the constant rise of the groundwater table, which affected the foundations of both monuments and houses (Ibrahim 1982, 66). Furthermore, 120000 Nubians had to leave their homes for the dam to be built and 70000 of them living in Egypt saw their land flooded by the new lake and had to abandon their traditional mudbrick houses to be re-settled by the government in Kom Ombo (Ibrahim and Ibrahim 2003, 90).

Moreover, the making of both mudbrick and red brick, an industry which employed around 300000 people (Cowen 2009), depended on the Nile silt. With the loss of Nile silt after the building of the Aswan High dam, it became necessary to obtain this soil either from the banks of the Nile –which damaged the river course- or removing the topsoil –therefore decreasing soil fertility further (Ibrahim 1982, 66).

The problem escalated and, in 1985, President Mubarak issued a decree banning the removal of topsoil for mudbrick making and closing all the red brick factories that relied on mud for their production, in the hope that the use of mud as raw material for both mudbricks and red bricks would be abandoned in favour of shale and cement alternatives (MacKenzie 1985, 10). In addition, after the building of the High Aswan Dam, the price of red bricks increased substantially, caused by the scarcity of raw materials and the demand of new masses who sought a higher standard of living, as will be explained below (MacKenzie 1985, 10). Red bricks made of shale rather than mud started being fabricated in factories imported from Europe, particularly France (MacKenzie 1985, 10). These red bricks looked the same as the mud-based ones, even if they were harder to manufacture. There was also an increase in the use of cement. Therefore, the closures had an effect on the use of mud as a building material, whether fired or not, although clandestine production of bricks from mud remained (MacKenzie 1985, 10).

Although the building of the High Aswan dam multiplied their effects, the changes in distribution and characteristics of mudbrick architecture caused by new land exploitation had already started in the early years of the 20th century with the introduction of all-year-round crops.

Before the original attempts to dam the Nile and the introduction of all- year-round crops, villages in Lower Egypt normally developed on top of high ground to escape the Nile flood (Mahgoub 2000, 1); the high location gave these settlements the aspect of isolated mounds in the summer (Lozach 1930, 7). Where the flood was not feared or when the village was not very old, settlements would also develop at field level. *Al-koum* (also ‘kom’, hill) denoted a village located above flood levels (Muselhi, 1990 cited in Mahgoub 2000, 3), while *nazlet* (downhill) referred to bedouin settlements by the side of the hills and away from the valley (Mahgoub 2000, 3). The traditional habitat was in dense villages, encouraged by a need for security (Mahgoub 2000, 1; Lozach 1930, 8). Moreover, the authorities’ need to collect tax encouraged concentrated populations as these were easier to manage administratively. As a result of this, building of hamlets or isolated houses was banned (Lozach 1930, 8). Finally, the old cultivation system only required the *fellahin* to work during the sowing and harvesting periods, hence there was no practical advantage in a dispersed habitat pattern (Demangeon 1926, 172).

Overall, before the cultivation system was altered, concentration of houses was the norm, while dispersion only occurred close to Cairo, perhaps because of a laxity in traditions and contact with widely urbanized areas (Lozach 1930, 35). In fact, later on, the areas close to Cairo would be the most prone to adopting the construction methods and planning of the capital and of other large cities (Mahgoub 2000, 9).

In the centre and south of Lower Egypt, for example, the population was notably dense, despite the extreme fragmentation of property, abundance of water and flat land available (Lozach 1930, 5). In addition, the costly price of land, the high fragmentation caused by Muslim inheritance traditions, and lack of ownership meant larger plots of land on which to build were unavailable (Lozach 1930, 13). Consequently, collapsed houses were rebuilt in the exact same position or very near to where they stood, forming *koms* (Lozach 1930, 30). Houses in this area usually had the appearance of small, thick-walled blocks of mud, with few or no windows (Lozach 1930, 30). Security or moral reasons could explain some of these characteristics, such as the absence of openings (Lozach 1930, 30). However, cultural and economic reasons could also shed some light on the house as a whole; most of the agricultural life and activities took place in the open, while the house was often conceived as a shelter, a place to lodge men, beasts and work tools (Lozach 1930, 31). The division of old houses into smaller houses, usually due to inheritance reasons and the need to house the growing population, was also a common phenomenon (Mahgoub 2000, 9).

Life and sociocultural relations revolved mainly around the land, not around the house (Maghoub 2000, 1). In most cases the *fellahin* had to work other people’s land as their own land produce was not enough to survive (Demangeon 1926, 170). Therefore, with most *fellahin* working for large owners, not much space was needed for the storage of harvest in their own houses as they had little or no produce of their own (Lozach 1930, 24).

Mahgoub (2000, 3) identified three parts in the traditional *kom* village before irrigation control: the top of the hill, with the mosque and the house and guesthouses of the rulers of the village; a ring road (*dayer al nahya*) which was under water during the flood and which otherwise served as a place of gathering for the villagers; below this, a network of streets, with the streets branching from the *dayer al nahya* street being ideal locations for houses, away from the flood. The lack of space and the need for protection meant these streets had to be very narrow. Only the cemetery, the grain silos and the weekly markets were located away from the mound (Mahgoub 2000, 4) (Fig. 3.1).

However, with the introduction of all-year-round crops and permanent irrigation, farmers needed to be close to the crop fields, which led to the construction of *ezbah* in the agricultural lands, creating a much more dispersed habitational pattern

(Demangeon 1926, 173). These *ezbah* were normally formed by rectangular buildings hosting ten to thirty families, with two or three rooms each and a small courtyard to keep animals. They were built with both red and mud brick and could be grouped around a large courtyard where a pump was located outside the foreman's house (Lozach 1930, 40; Mahgoub 2000, 6). They appeared close to irrigation canals, which were used for rubbish disposal (Mahgoub 2006, 6).

Therefore, in Lower Egypt, two forms of rural habitat seem to have coexisted during the 20th century, one explained by the survival of past traditions, the other one by the emergence of a new type of exploitation (Lozach 1930, 55). However, other consequences of the damming of the Nile could have been as influential, such as the availability of new soil, which helped to solve the space problems. Protection from the flood was not necessary anymore, *kom* villages expanded below the flood levels marked by the *dayer al nahyia street* and came to be situated in the flat agricultural land, hence new villages appeared on these lower grounds (Mahgoub 2000, 5).

In Middle and Upper Egypt, the *ezbah* appear to have been associated with large cultivation areas, while their middle and small counterparts were located within the village (Hug 1930, 112). However, Middle and Upper Egypt habitation patterns before the damming of the Nile seem to have been slightly different from one another overall, perhaps because of a mixture of differences in climate, rural economy and tradition (Hug 1930, 113). It would appear that the traditional dense house seen in Lower Egypt would have been more common in Middle Egypt and Fayum, perhaps associated with a colder climate, while a model of extended house suited the hot climate of Upper Egypt better. It is also possible that the dense house would have been the result of the need to accomodate a great number of people in a very small area, or even a natural evolution of the Upper Egypt model, originally influenced more by campsites (Hug 1930, 122).

Practical reasons, such as taxation, could have had an influence on the recurrence of dense houses, since it used to be the land that was taxed and not the built property. Moreover, to enlarge the house, permission from both neighbours and the governement was necessary (Hug 1930, 119). Building several floors or creating a passage linking with a house on the other side of the road in narrow streets would therefore have been easier solutions for expansion.

However, it would appear that the presence of dense and extended houses in both areas would have also depended on the social status and economic possibilities of the owners. In that sense, the dense house would have been associated with poorer members of the community, while richer owners could have afforded an extended house. A fundamental reason for this would have been the amount of land owned (Gheith, 1988 in Mahgoub 2000, 7); owners of small amounts of land would have had to accumulate all their belongings into a minimal space while larger land-owners had the ability to enlarge the house and build larger rooms (Hug 1930, 114).

3.1.3. Land ownership and economic factors

Before Mohammed Ali's reform of agriculture, most of the land belonged to the state, although in practice it was controlled by *multazim* who acted as feudal lords and employed people as such (Baer 1962, 1). Mohammed Ali started a process of transferring this land to his supporters and relatives; finally, in 1811, all *multazim* land was confiscated and turned into state land (Baer 1962, 4). *Fellahin* did not receive full ownership or inheritance rights over land during this period; they still passed the right of cultivation from father to son, but they only possessed usufruct rights (Baer 1962, 6). The peasants hardly kept any of the harvest, especially if this was cotton, just maize and wheat in some cases (Lozach 1930, 13).

From 1855, under Wali Said (1854-1863) male *fellahin* and some female *fellahin* were allowed to inherit land (Baer 1962, 8). During Ismail's mandate (1863-1879), property rights kept increasing. By 1871, almost all the differences between the types of lands were removed and most of the land was under full private ownership (Baer 1962, 10). In 1883 the Muslim inheritance law was also applied to *fellahin* land (Baer 1962, 78). Property started to be shared between more tenants, but these became poorer, due in part to the inheritance traditions that encourage a high level of fragmentation (Lozach 1930, 14). Consequently, a class of people that needed to work on other people's cultivation areas grew up (Lozach 1930, 15). The abundant workforce meant that the introduction of machinery was not essential (Lozach 1930, 16) and this prevented an industrial revolution similar to that taken place in Europe, which in turn hindered Egypt's self-sufficiency.

The practice of splitting the land as inheritance continued alongside the growth in population and this, as well as certain economic factors, increased fragmentation further (Baer 1962, 79). While small properties increased considerably, landownership was, in reality, concentrated in a few hands (Baer 1962, 72-83).

The amount of peasants who owned land fluctuated depending on the economic situation of the country. For example, during the crisis of the years before 1907-14 and 1930, some of the small fellahin landowners lost their land. Through the first years of the century and during and immediately after the First and Second World War, there were significant attempts at selling state land to small landowners or landless peasants (Baer 1962, 84). According to Demangeon (1926, 129), the access to land by peasants was favoured by these practices. However, in Baer's opinion the access of fellahin to property then was only circumstantial, and, in practice, access was very limited (Baer 1962).

The 'Law of Five Feddans' (1912) stated that agricultural holdings of farmers with no more than five feddans (one feddan approximately equals one acre) could not be seized for debt (Baer 1962, 89). This law remained in place until the 1960s, but there is disagreement whether or not it had a general effect on *fellahin* ownership. In any case, both this law and the increase in the price of cotton, particularly during 1916-1919, allowed some fellahin to buy land. However in 1947, 94% of owners owned only 34% of the land (Margold 1957, 9), which was one of the reasons for discontent in the 1951 revolts (Baer 1962, 221). It therefore appears that the successive government measures to encourage fellahin land ownership did not have any significant impact at least until the revolution of 1952 and Nasser's measures (Baer 1962, 84-90). He redistributed 550000 feddans (570900 acres) amongst c. 250000 *fellahin* families (Margold 1957, 9).

Through this land reform, the maximum amount of land that could be legally owned was reduced from 200 feddans to 100, and then further reduced to 50 in 1969 (Marsot 1985, 121). In addition, the legal situation of those working on rented land improved. However, where this distribution did take place, fragmentation had a negative effect on production (Marsot 1985, 94).

By the mid 1960s, the economy was starting to deteriorate due in part to the complex international situation in which Egypt found itself (Marsot 1985, 121).

When Sadat (1970-1981) replaced Nasser, he implemented an open-door policy (Ibrahim and Ibrahim 2003, 135), which increased dependence on Western countries –whose loans Egypt could not repay- and meant that national industries were unable to compete with foreign imports (Marsot 1985, 143).

This policy caused inflation but it also developed a new consumer class which contrasted with the austerity of the Nasser years (1956-1970). During this period, a substantial number of *fellahin* workers emigrated to oil-rich countries to work in construction (Marsot 1985, 136). On their return, these *fellahin* invested in land causing its price to increase rapidly (Fakhouri 1972, 19). Others opted for investing in red brick constructions only, rather than land, as these started replacing land as indicative of social status within the community (Bach 1998, 190). The new buildings erected in these lands were made of red brick and turned into a symbol of high status, raising their poorer neighbours' aspirations ('*balad ish-mina'* or 'If my neighbour can do it, why can't I?') (Fakhouri 1972, 19).

Products and luxury goods were imported from abroad and replaced local produce. The country became increasingly westernised, and adopted a capitalist way of living (Marsot 1985, 137). Westernisation also affected construction materials and methods, and the transition to an industrial economy accelerated (Mahgoub 2000, 9) as the gap between the rich and the poor widened.

During the 1970s and 1980s, the rise in population continued and a massive exodus from the countryside to towns and cities took place (Marsot 1985, 142). In the same period, food production decreased in spite of land reclamation policies and attempts to spread birth control. During this period, Egypt changed from exporting food to importing it (Ibrahim and Ibrahim 2003, 2).

In parallel to this, between 1970 and 2001, the advances in agricultural mechanisation meant the need for manual labour was reduced. In addition, as a consequence of a deregulated economy and the need to compete against international companies, unemployment became a major problem as a whole (Ibrahim and Ibrahim 2003, 99), despite Mubarak (1981 – 2011) carrying out five-year plans for restructuring the economy, and the Structural Adjustment programmes in 1991 (Ibrahim and Ibrahim 2003, 95). This workforce migrated to the services and construction sector (Ibrahim and Ibrahim 2003, 101). Part of this force also migrated abroad although they were then forced to return due to problems in the countries they had migrated to, e.g. 1 million Egyptians who were working in Iraq had to leave when the Gulf War started in 1991.

Their return posed a problem both for the economy and for themselves (Ibrahim and Ibrahim 2003, 102). These emigrants usually spent at least part of the money earned abroad on housing, with the help of generous subsidies from the government. However, these houses remained unoccupied in many cases, adding to the housing problem. In addition, although this money allowed the families of workers to raise their economic capability, it also raised inflation which affected the poor collectively.

3.1.4. Social, community and individual factors

As explained above, the economic circumstances which forced rural workers to migrate to oil-producing Arab countries altered traditional relations in rural society; one of the consequences being the need to establish social differentiation through the use of non-traditional materials, namely red brick and concrete.

Nevertheless, other contemporary social changes would have also influenced the changes in the material, appearance and internal distribution of rural houses. Changes in rural society were helped by better access to education and mass media (Hopkins and Westergaard 1998, 1), partially as a consequence of the urbanization of the countryside prompted by the agrarian reforms in 1952 (Hopkins and Westergaard 1998, 3).

The social relations within the rural communities in Egypt have evolved and changed, especially in the last decades. Education and work abroad replaced land in portraying status, and changed the aspirations of villagers, affecting the relations both between and within families (Bach 1998, 184).

When some families started sending their children to Cairo or to the closest province capital to receive formal education, this prompted, on the one hand, the rise of the family's prestige within the community; and on the other, the aspirations of those educated members of the family who aspired to urban ways of living, including housing (Bach 1998, 188). Red brick was an element of differentiation which first related to rich farmers, but then passed to become a sign of education and affluence

(Bach 1998, 189). The new houses, with separate areas for married sons or for brothers, reflected the changes in society structure (Bach 1998, 189).

Bach (1998) described the changes that occurred in a village in Sharqiya province between 1983 and 1993. In this time, the amount of extended households declined (Bach 1998, 185). These households, which traditionally hosted three generations, with the head of family, his offspring and their families living under the same roof, started transforming into nuclear households of couples with unmarried children (Bach 1988, 185).

Therefore, modifications in social aspirations prompted the more general use of red brick, while social structure and family changes brought about alterations in the distribution and use of space of traditional houses.

In addition to these general changes, the particular circumstances of each community would have also determined its history (Hopkins and Westergaard 1998, 3) and would have likely had an influence on rural domestic architecture. The specific development of land ownership in the area, the proximity to urban centres and to communication axes would have made the architecture more or less open to external influences. Again, the possibility of tribal structures within the community could have increased diversity in architectural solutions and features; and lastly, the existence of local industries had the potential of prompting specific features and their particular characteristics.

3.1.3. Conclusion

The presence, location and features of Egyptian mudbrick houses were directly and indirectly affected by the political and economic developments in the country during the 20th century, as was the transition from mudbrick to red brick and other Western materials.

The changes in land exploitation and cultivation appear to have had an impact in the geographical location and general spatial distribution of mudbrick houses, due mainly to the cultivation of all-year-round crops and the disappearance of the yearly flood after the damming of the Nile. However, these modifications could have also been motivated by changes in tradition, the evolution of financial possibilities, the lack of space due to overpopulation, as well as social and cultural reasons.

The transition from mud to red brick was affected by economic factors. As mentioned, well-off countryside houses were already using it as a material -at least partially- in the first couple of decades of the 20th century (Lozach, 1930). However, the desire to fulfil certain social aspirations would have increased its use, helped by the increase in purchasing power of the *fellahin*, much of it caused thanks to the emigration to oil-producing countries. This reinforced the already existing association of red brick with rich owners and deepened the social differences within the rural communities. It became a vehicle of social differentiation that most people were keen on taking advantage of at any price (Fakhouri 1972, 19). The import of non-traditional materials to make up for the scarcity of mud – previously affected by the introduction of damming - encouraged this transition. These new expectations were also created as a consequence of the contact with both urban and foreign ways of life, causing changes in household patterns which in turn reflected on changes in the distribution and use of space.

Therefore, the appearance of the rural Egyptian house, its characteristics in different geographical areas and its evolution throughout time appear to be a response to a combination of environmental, sociocultural, political and economic factors for which a cause-consequence relation is often hard to establish and which must be understood holistically.

The analysis of the evolution of traditional mudbrick houses in the 20th century has proved particularly useful not only in providing an explanation for the particular characteristics of mudbrick houses, but also in offering an insight into the kind of factors that might motivate the choice of a certain building material over others. As well as having practical implications for the study of archaeological remains, it has also provided relevant tools for the interpretation of the differences and similarities between these remains over different geographical areas and throughout time, highlighting the complexity of factors involved in building and living choices.

Finally, it has broken down and validated the many levels that affect the physical entity of mudbrick domestic architecture, from the natural geographical conditions and human modifications of the environment, to the particular economic and political situation, not forgetting the cultural and social influences and the weight of tradition in vernacular building, as well as the particular circumstances of each community and the ultimate private choice of the individual.

3.2. Materials and features

3.2.0. Introduction

The aim of this section is to offer a description of materials and features of mudbrick houses across three areas: Lower Egypt, Upper Egypt and Dakhleh Oasis. The purpose of this comparison is to acquire an understanding of the types of architectural features in each area, to explore the possible reasons for their presence and investigate their recurrence within a certain context, as well as to explain the similarities and differences between areas. This can provide an insight into possible associations of certain features with various contextual factors such as social aspects (e.g. status), a suggestion which has been put forward when interpreting ancient Egyptian houses (see Crocker 1985). For this purpose, a classification of features was proposed (Fig. 3.2), based on standard architectural descriptive practices, to provide an orderly description and to guarantee consistency, and enable comparison between areas. In addition, from a methodological point of view, the classification provides a standardised method which can be later applied to the comprehensive record of domestic feature archaeological remains. Lastly, the comparative investigation of different areas also avoids geographical and quantitative bias, obstacles that have hindered a synthesis of ancient Egyptian house remains.

This section therefore aims to combine the research fieldwork with the work of previous researchers to offer a generic picture of the materials and an overview of the most prominent features within each of the areas chosen, as indicated by the samples studied.

As explained in section 2.3.2.2.1, data for Lower Egypt was collected during fieldwork undertaken in 2009 in the governorates of Kafr el Sheikh and Gharbeya. Architectural features were documented in the field through the completion of checklists (see Appendix, document 7) and photography, as well as during surveys and interviews. In addition, the publication 'L'habitat rurale d'Égypte' (vol.1: Lower Egypt) (Lozach and Hug, 1930) was used for data regarding the governorates of

Menoufiya, Dakahliya, Sharquiya, Beheira and Qalyubiya (in addition to the two previously mentioned governorates).

The fieldwork data for Upper Egypt focused on the governorates of Luxor and Qena (Hu, Shenhur, Dendera and Qift) with information being obtained both from fieldwork and other sources, namely Castel's (1984) survey in Qurnet Marei, the Old Qurna and Naqada surveys from Hassan Fathy's personal collection (RBSCL – AUC), and Henein (1988)'s ethnographic study of Mari Girgis (Sohag).

The data sources for Dakhleh Oasis were the multidisciplinary Dakhleh Oasis Project, in particular Schijns (2008), as well as de Filippi (2006) (Balat and al-Qasr) and Hivernel (1996).

3.2.1. Nile Delta

3.2.1.1. External finishes

3.2.1.1.1. Roofs

3.2.1.1.1.1. Materials

The materials involved in roofing are wood, reeds and mud, although mud is not always present.

Wood can be obtained from local trees (trunks and branches from palm tree, acacia, eucalyptus, casuarina and sycamore (Lozach 1930, 20)) or be imported, and used for beams and joists; reeds are obtained from plants (stems and twigs of both broadleaf plants and grasses) and are used for matting or for adding weight to the roof.

The most common plants are grasses, particularly cereals such as sugar cane and maize, as well as leguminous plants such as alfalfa.

3.2.1.1.1.2. Types

Roofs range from mere shades against the sun to sturdy ceilings capable of bearing the load of another floor. In most cases, roof and ceilings are made of a single structure.

The most basic type of covering consists of piled unbound branches, without a strict arrangement, and which can also be topped with hay (Fig. 3.3 top). This type of roof is not usually designed to cover extended areas due to its poor resistance to the elements (Castel 1984, 138), making it unsuitable for human living areas. These branches can rest on whole tree trunks. In the case of the Nile Delta, the research fieldwork indicates that this type of covering is nowadays mostly used for low-walled animal pen areas or for animal or storage areas located in roof terraces. However, Lozach described a similar type of roof (palm tree branches or more often reeds –covered or not with mud– piled on top of a wooden beam) and observed that it appeared in the houses of the 'poorest' members of the community (Lozach 1930, 28), which suggests that this is a cheap roofing technique which might also be used for other areas, aside from animal and storage rooms, when studier options are not available.

Beyond this basic covering, a number of different elements can appear together to form a sturdier roof, although not all of them are always necessarily present (Fig. 3.3 bottom). The first are beams in the form of tree trunks spanning across the room (Fig. 3.4 top). In some cases, for example when a wall has been removed, larger beams are placed under the roof beams perpendicularly to them, to brace the roof and provide further structural support. Roof beams usually penetrate approximately 20cm into the wall, or even pass through the wall completely, protruding out from the external face of the wall (Castel 1984, 138). Above this, matting made of palm leaf ribs can be found, tied together with identical transversal ribs at intervals, which usually are incorporated into the walls on either side. These transversal ribs are usually tied to the matting with palm fibres (Castel 1984, 138). However in some cases, the ribs are not tied together, only piled in perpendicular layers (Fig. 3.4 middle); similarly, transversal ribs do not always feature.

This structure can be completed by an upper layer of palm leaves, placed perpendicularly to the ribs with the aim of covering any possible gaps (Castel 1984, 138) or another substitute such as plastic sheeting can be found (Fig. 3.4 bottom). Above this, mudbricks can be placed –possibly to add weight- and over them, to finalise, a layer of clay and straw. Lozach (1930, 28) documented this roof of matted reeds, above European-imported beams, covered by a layer of mud and sometimes mud bricks placed above it. He identified it as belonging to better-off houses than the previous type, which suggested to him that, perhaps, the availability of a larger income was used to improve the roof in a way that meant that sturdier roofs were progressively available to a wider spectrum of the population and therefore gradually substituted the former, and weaker, type. Nevertheless, this implies the assumption of a direct correlation between economic means and material development, as well as taking for granted that the substitution of weak roofs by sturdy ones necessarily translates into an improvement of living conditions or of the performance of activities undertaken in that room. In fact, a coexistence of both types of roofs independently of an increase of wealth seems more likely, the persistence of weaker roofs explained by other factors such as practicality – for example, the convenience of having a roof which allows light through while providing some shade, the possibility of a light roof doubling up as fodder, which can be accessed when needed (Caroline Simpson, pers. comm.) or the mere preference not to 'waste' money on providing a sturdy roof for areas which might not strictly require it. Rather, Lozach's observation should be taken as an indication of the fact that, where economic possibilities do not allow sturdy roofs regardless of their suitability, weak roofs throughout might be unavoidable, as pointed out earlier; however, this does not mean that all weak roofs respond to a low economic capability.

While a sturdy roof allows for the building of another storey above it, it does not necessarily indicate that an upper floor would always be present.

As for the external appearance of the roof, a variety of finishes were witnessed through fieldwork, although dry branches (most commonly palm ribs) and/or piled hay are usually present (Fig. 3.5 top left). In certain cases, dry cotton plant branches can replace hay, which might in some cases indicate a larger economic capability of the owner (Fig. 3.5 top right). Dry branches are placed perpendicularly to the main façades and can be laid directly over the upmost mud bricks, mud layer or wattle, or over dry dung patties. A layer of branches is sometimes reinforced at the front by other branches laid parallel to the façade. Another feature witnessed during fieldwork were planks of wood that had been laid over the protruding beams of the ground floor's ceiling, forming a shade or external canopy (Fig. 3.5 top left).

Where branches are present, hay can be piled on top of them; where there are no dry branches hay can also be piled directly over the uppermost mud bricks or mud layer, but also over a sheeting of polythene or other plastics (Fig. 3.5 bottom left). In some instances, it is difficult to confirm whether one or more of these elements are present due to the abundant amount of hay on the roof.

On rare occasions, the roof is only covered by mud and has a flat appearance, without any further addition. Sometimes piles of dung patties for fuel can be stored on this flat surface (Fig. 3.5 bottom right).

3.2.1.1.2. Walls

3.2.1.1.2.1. Materials

The main material for bricks, mortar and render is mud, coming from agricultural areas or from the clearing of canals (an extended description of the properties of mud can be found in the Appendix, Document 8). As observed during fieldwork, this can be of different colours, not only between different villages but also within areas of the same village, ranging from a light, sandy colour to dark grey. The difference in colour is due to the difference of the natural amount of sand in the mud, with a lighter colour indicating a higher amount of sand and vice versa. Lozach (1930, 26) noted how the colour of the bricks was grey and less resistant when the alluvial mud contained more sand, like in the centre of Menoufiya and regions close to the desert, while it was brown in most places. For example, the mud found closer to the Nile tends to be darker, with the exception of sand banks in or next to the river. Colour can also vary where repairs have been made, as the proportion of the different components is unlikely to be identical over time and consequently matching the previous colour can be difficult.

During this research’s fieldwork, information about the mudbrick making process was received orally: agricultural earth from the fields outside the village was mixed with small pieces of straw and left for two days in water to make a paste. Lozach (1930, 26) also obtained information about rice and *berseem* straw being used as temper. This research’s informants described how, afterwards, the mix was put on the floor in the sun and cut with a wooden frame (with extended ends for carrying it). It is possible though that this process was once done completely manually, as suggested by the responses obtained by Lozach (1930, 26) which mentioned members of a family or specialist masons making bricks by hand rather than using a mould. Once the mud was in place within the wooden frame of the mould, the surface was repeatedly smoothed out. Eventually the frame was removed and the wet brick-shaped mixture was left to dry in the sun for another two days. This process was repeated with the same frame to cut other bricks with the same proportions, the number depending upon request. After two days, the bricks were ready for use.

Mud was also mixed with straw for the render, with which the walls are plastered to protect the brickwork. The mix was the same but with more water, and need not be left to dry in the sun. The quantity of straw included in the render can vary importantly and this determines the external aspect of the structure.

For the mortar, the purpose of which is to hold the bricks together and keep the cohesion of the wall, only mud and water are mixed, not straw. This was the most common mortar available in the sample, although occasionally cement could also be used especially when repairing.

Red brick can be used to build the first few courses closest to the ground in order to protect the walls from erosion caused by salt and seeping water, or for repairs.

An example of the use of wood in the form of beams placed within the wall between brick courses was also found, as well as extended lintels above doors and windows.

3.2.1.1.2.2. Types

There are two main types of walls: those built with only mud and reeds, in wattle and daub arrangement, and those built with mudbricks. The first ones are usually restricted to animal areas and pigeon houses, while the second ones are used as walls of the residential areas. Mudbrick walls in the sample were approximately 2.5-3m high for one-storey houses and an average of 6m in height for two-storey ones. The thickness of the main walls was of approximately 40-60cm, with two or three brick leaves tied together. Lozach (1930, 27-28) described this type of wall, several bricks thick, as one whose purpose was to make the wall solid and to maintain a comfortable temperature.

These bricks are always bonded with mud mortar, with no recorded cases of bricks stacked without mortar. This mortar is used both to join different brick courses and to join bricks in the same course (that is to say, horizontally and vertically across the wall). The walls can present different types of bonding: in Lower Egypt, the so-called ‘common bond’ (A6 in Spencer’s (1979) corpus of brick bonds), which alternates two rows of stretchers with one of headers, was witnessed almost exclusively during fieldwork (Fig. 3.6 top left). However, the number of courses of stretchers per course of headers can vary not just between different houses but also within the same wall. A smaller number of structures showed an irregular or regular bonding of stretchers, headers and brick on edge (Fig. 3.6. top right and bottom left, respectively). It would appear from observation that the more temporary the structure – such as animal sheds — the less important the bonding, as perhaps there is no structural need given that they are usually one-storey high and can be easily built and rebuilt (Fig. 3.6 bottom right).

Bricks-on-edge can also be used for structural reasons, such as reinforcement at the top and bottom of windows, and top of doors. Brick-on-edge is also very commonly used at the top of the front façade for supporting the roof, although this function can also be performed by red bricks.

This bonding is most commonly rendered. The render can be of various thicknesses, consistency and finish, depending on its exact composition, as well as the amount of times that the wall has been re-rendered. In an instance, the render presented inclusions in the form of animal wool, stones, shells and fragments of glazed pottery (Fig. 3.7 a, b, c). This is most likely due to their compacting effect on mud render (Morton 2008, 82), although these elements could also be incorporated during maintenance processes (McIntosh 1974, cited in David and Kramer (2001)).

On some occasions the render may be painted in bright pastel colours, but this is not widespread (Fig. 3.7 d), perhaps due to the state of disrepair of most houses. A small number of houses, which were also painted, were rendered with a cement mixture rather than with mud (Fig. 3.7 e).

Walls normally have a straight profile, although they can also be battered, sloping inwards from the bottom to the top (Fig. 3.8 top left). This profile can be bulged, indicating internal areas where large mud containers are located (Fig. 3.8 top right). This curving can also only occur at the very bottom, due to both accumulation of dust from the street and repetitive plastering to protect the first courses of the wall (Fig. 3.8 bottom left).

Less frequently within the sample, decorative mouldings appeared on walls following the line of the ground floor's ceiling, or above other areas such as windows.

Pillars are sometimes used to reinforce exterior corners or as buttresses at either side of the door, most likely as a form of protection against animals and street traffic (Fig. 3.8 bottom right).

3.2.1.1.3. Doors

3.2.1.1.3.1. Materials

All doors to main living buildings are made of wood, most of which is imported nowadays. However, gates, as well as entrance to other adjacent buildings can also be made from iron or other metal.

The average dimensions of a main doorway are 220 cm x 130cm. The width of the doors ranged from 90 to 130cm; the height ranged from 155 to 230cm.

3.2.1.1.3.2. Types

There is usually only one door which is the front door. However some buildings have one door at the front and one at the back (in one case at the side); the door at the back was said to be for animals, according to oral sources.

There are two main types of wooden doors; one would appear to be older and traditional, while the other one is presumably highly influenced by Western models.

The traditional door is sturdy and single-leafed (Fig. 3.9 top left). It is built by joining several vertical panels of wood together. These can also have an additional reinforcement on the back of the door, in the form of horizontal wooden strips. This door only has one jamb on which the door pivots. A socket at the top and the bottom of the doorway allows this pivoting (Fig. 3.9 top right). This type of door needs a sturdy lintel above the doorway to support the jamb which holds the weight of the door (Fig. 3.9 bottom left). This lintel is usually formed by several small wooden trunks, each separated from the next by the length of a brick. The same structural role is played by the frequent presence of a buttress on the section of the inner wall opposite to the jamb (Fig. 3.9 top left). A small piece of wood may be placed perpendicularly at the top of the jamb as an extra precaution to prevent it from moving forwards in time. All doors in the sample opened inwards by means of the hinges attached to the wooden right jamb.

This door can be locked from the inside with a wooden bolt. The bolt is formed by a vertical piece of wood, sometimes with another three pieces forming a rectangle, and a horizontal piece of wood sliding through and reaching the hole made in the other extreme of the wall for the purposes of keeping the door closed (Fig. 3.10 left). Several small internal pegs may be located inside the vertical piece of wood for added security and can only be unblocked by means of a special pronged key. These locks are nowadays usually complemented on the outside by a metal hasp with a padlock (Fig. 3.10 middle). Where the traditional wooden inside lock does not exist anymore, doors only present modern outside bolts with metal hasps, which can also be closed with padlocks.

A variant of a traditional door also recorded during fieldwork featured a smaller door cut out inside wood panelling which covered the total extension of the doorway (Fig. 3.10 right). This wood panelling had matching wooden jambs at either side and the doorway was reinforced by a wooden lintel as well as several unworked pieces of wood.

The Western door type is usually double-leafed, with the leaf pivoting on metal hinges attached to a door frame (Fig. 3.9 bottom right), a wooden lintel, metal handles and a metal bolt. The wood panelling in them can present mouldings and embossed decorations –usually with typically Egyptian motifs, such as eagles and lotus flowers.

A step may be built on the doorway to close the gap between the street level and the floor of the house.

3.2.1.1.4. Windows

3.2.1.1.4.1. Materials

Small openings at second storey level may be left uncovered and unsupported by lintels. However, most commonly, wood is used for windows, lintels and jambs, and metal for bars and decorations. This wood can be of palm tree or acacia. Glass was not recorded through fieldwork, neither did Lozach record any examples (Lozach 1930, 30).

3.2.1.1.4.2. Types

There is a range of possibilities related to the partial or total closure of the opening. When partially closed, this is done by means of wooden bars or a grid of intertwined reeds or branches (Fig. 3.11 a). This is particularly the case for small openings and those associated with pigeon houses or animal areas. When the possibility of totally closing the opening is sought, this is in the form of windows. Wooden windows usually have a wooden frame, lintel and jambs (Fig. 3.11 b). Lintels above windows can extend further at either side of the opening; in fact, in certain cases, one single piece of wood serves as a lintel for two or more windows. In one case, the lintel was decorated with an extra piece of wood in a serrated shape.

Sometimes metal can be used for bars or decorative grilles to allow for extra security (Fig. 3.11 c). Behind the bars there are usually single or double wooden shutters, which also appear on their own, without bars/grilles.

The wooden window described, complemented by metal bars/grilles and shutters, is a very common window in the Delta area that can be present in both upper and lower storeys. In a smaller number of cases, the window was covered by two wooden leaves without shutters (Fig. 3.11 d).

Whether full wooden windows are present or not, a common practice was to block openings up totally or partially with bricks, mud, plastic or metal sheeting, depending on the desired amount of light/air in a particular time of the year but also to do with changes in the use of that particular room (Fig. 3.11 e).

Lozach (1930, 29) recorded most openings in Lower Egypt as being small and narrow, causing rooms to be poorly ventilated and with little light. However, he also noted that a change towards large windows, of the European size, was starting to take place (Lozach 1930, 30). This seems to have indeed been the process, because most of the openings found during fieldwork in the Nile Delta were covered by windows of a large size (averaging 85 x 120 cm in survey) and no instances of buildings with very small or no openings were recorded during fieldwork. The number of external openings witnessed during fieldwork in the provinces of Kafr el Sheikh and Gharbeya varied between two and eight, with most recorded houses having over four openings.

3.2.1.1.5. Features

3.2.1.1.5.1. Balconies

Two examples of balconies were recorded during fieldwork; one was made of wooden strips arranged horizontally; this structure was supported on three perpendicular wooden beams, mudbricks on edge and a mixture of palm leaves and mud (Fig. 3.12 a). The other one was a wooden balcony supported on wooden beams (Fig. 3.12 c).

3.2.1.1.5.2. Pigeonhouses

Pigeon breeding is an important activity in the Egyptian countryside, mainly due to the value of pigeon droppings as fertiliser, as well as pigeons for consumption (Rael, 2009). Pigeonhouses can be built on the roof of both single and multiple storey houses (Fig. 3.12 b). They can be built in wattle and daub, with branches and reeds mixed with mud, or in red brick and plastered with mud. They can have small openings as described in the window section, covered with metallic or wooden grilles or bars, and are roofed with reeds and branches.

3.2.1.1.5.3. Mastabas (mud benches)

The mastaba is a mud bench attached to the front façade of the house that is present in some houses. It has mainly a social function, providing a space where owners and neighbours –or acquaintances- can sit and talk, without having to be invited into the reception room (Fig. 3.12 d).

3.2.1.1.5.4. Drainage barrier

Many houses in the Delta, in particular those which have sunk below the modern street level, have a protective barrier made of soil around the main door. The aim of this barrier appears to be mainly to protect the entrance from water as well as preventing the accumulation of dust and soil inside the house (Fig. 3.12 e).

3.2.1.2. Interior finishes

3.2.1.2.1. Ceilings

3.2.1.2.1.1.1. Materials

These are the same as described for the roof, given that, in most cases, ceilings and roofs are made of a single structure.

3.2.1.2.1.1.2. Types

Ceilings can be of different types in accordance with the types of roofs described above. When the roof is formed only by branches, no ceiling exists as such. If the roof is formed by a layered structure of wood beams and a palm wattle, the ceiling can have two finishes: most commonly within the sample, the matted reeds and beams were exposed, showing the full structure of the roof (Fig. 3.13 top). This could be due to lack of maintenance, but the total absence in multiple instances of any plaster or paint remains make it a plausible common finish. However, the structure can also less commonly be plastered with mud and painted (Fig. 3.13 middle). On a couple of occasions, the matted reeds were substituted by wooden planks, forming a flat ceiling (Fig. 3.13 bottom). Where black marks on these planks occur, this suggests that a fire would have repeatedly been used in the room without any ventilation or extraction provision. In the case of beam and wattle ceilings, this tends to materialise in a layer of ash, giving it a grey appearance.

3.2.1.2.3. Walls

3.2.1.2.3.1.1. Materials

Inner walls are of the same structure and elements as outer walls.

3.2.1.2.3.1.2. Types

They are generally rendered with mud –although on occasions they can be plastered with cement- aside from those areas for animals/storage in which sometimes the brick walls are left plain finish. They are painted with one or several bright pastel colours –most commonly, light blue, pink and yellow. Paint on inner walls is more common than on outer walls within the sample. Occasionally, designs can be seen depicting palm trees or pigeons (Fig. 3.14 top).

The thickness of the inner walls was of approximately 30 cm across the sample, although walls can become thinner as they approach an upper floor.

3.2.1.2.4. Doors

3.2.1.2.4.1. Materials

These are the same as those of the main door, made of wood and corrugated metal sheeting for gates linking the residential building with a courtyard.

3.2.1.2.4.2. Types

Inner doors tend to be of western style, whether single or double-leafed, swinging on hinges. All doors across the sample presented a door frame and the wood panelling was not decorated at all; they are normally locked with modern metal locks. In one house, these doors were placed up to approximately 20cm above ground level, reportedly to stop the animals entering the rooms and to protect them from the water (Fig. 3.14 middle).

In addition, door openings without a door-leaf can be present indoors. This can be just sustained by a lintel and without further signs of a door frame or door, perhaps only covered by a piece of material or not covered at all.

3.2.1.2.5. Windows

3.2.1.2.5.1. Materials

Materials tend to be wood for lintels, frame and shutters, while metal is less frequent.

3.2.1.2.5.2. Types

Inner windows, communicating different rooms or a room with a corridor, are not uncommon. They can have single wooden shutters and a frame, or be an opening with just a lintel and no window as such.

3.2.1.2.6. Others

3.2.1.2.6.1. Floors

Floors are most commonly unpaved, covered in flattened earth only and largely irregular in finish (Fig. 3.14 bottom). Occasionally, remains of cement tiles can be found, but most commonly where floors are covered, this is done with woven mats.

3.2.1.2.6.2. Mud containers

These are containers built with just mud paste, usually located in storage and animal areas inside the house (Fig. 3.15 top), and less frequently outside; on fewer occasions, they were built with red bricks and plastered with mud. They are located in storage and animal areas, usually elongated and not very large in diameter. They are frequently found in the upper storey, where available. These containers have two distinct functions, namely animal feeders and storage containers. Animal feeders would have one opening at the top and one at the bottom; the upper hole would allow them to be filled with grain or hay and the bottom one would allow the animal to access the food (Fig. 3.15 top, right end). Where they are used as storage containers, the bottom hole is usually covered by a wooden trapdoor (Fig. 3.15 top, middle). Another type of storage container is also built of mud, but it is of a small size and need not be elongated, usually having a trapdoor but no upper opening (Fig. 3.15, left end). Lozach (1930, 29) described the use of the beehive-shaped containers for grain storage in certain provinces and for liquids in others. As witnessed during fieldwork, the most common use of these containers is grain or corn storage, although honey can also be preserved in the smaller containers.

3.2.1.2.6.3. Pigeonholes

These can be located in the walls of the main room of a house and are holes set in the wall at high level (Fig. 3.15 middle). It is possible that they take advantage of the gaps already made by former protruding wooden beams. Sometimes, a small piece of wood or mud protuberance is found underneath for pigeons to stand on.

3.2.1.2.6.4. Niches

These are alcoves, with or without wooden lintels, carved in inner walls with a storage function (Fig. 3.15 bottom). They were uncovered across the sample and can be used to store small belongings. A particularly common niche is found on the side of staircases, with the function of keeping an oil lamp which provides light when going upstairs during the night or perhaps even during the day in gloomy houses (Fig. 3.15 top left).

3.2.1.2.6.5. Staircases

The staircases can be straight or dog-legged, but in all cases witnessed during fieldwork staircases were solid and built up against walls, as opposed to suspended (Fig 3.16 top left). Most of them had no handrail, although in a couple of examples a low mud wall acting as a handrail was recorded. The steps were built with mud bricks or solid mud and rendered with mud. The trims of the treads were wooden although they were usually also rendered with mud or considerably worn and were therefore hardly visible (Fig. 3.16 bottom left). A feature of some staircases was that the depth of their body (the gap underneath the stairs) was used as a cupboard or small storage room, which could be left open (Fig. 3.16 bottom right) or closed by a small wooden door. Equally, an oven could also be carved into the side of the staircase (see Fig. 3.17 left).

3.2.1.2.6.6. Ovens

Bread ovens are an almost essential feature of the mud house, usually associated with open or partially open storage and animal areas, although they can also be located outdoors.They usually have a pyramidal shape (Fig. 3.17 top right) with an opening in the middle where the fire is lit, and where a metal tray is fitted (Fig. 3.17 bottom right). Ovens are usually protected from drafts by placing them in a sheltered area; when they are in a rather unprotected location, they can be covered with standing branches forming a ‘tent’ and stones placed in front of the opening. A variant of stand-alone ovens are those embedded in the side of staircases; in those instances, two openings are present, a larger one at the top, and a smaller one at the bottom, where the metal tray is fitted (Fig 3.17 left).

3.2.2. Upper Egypt

3.2.2.1. Exterior finishes

3.2.2.1.1. Roofs

3.2.2.1.1.1. Materials

The materials are identical to those described for Lower Egypt, namely wood, reeds and mud.

The most commonly used wood both for its trunk and leaves, appears to be the palm tree, followed by the acacia *nilotica* and the tamarind (Hug 1930, 85). When used for beams, the trunks can be used in full, or be halved or squared (*fel(g)a noss* and *fel(g)a rob'* respectively (Castel 1984, 138)). It should be noted that this wood, in particular that of the palm tree, tends to rot easily because its fibrous trunk absorbs humidity (Hug 1930, 85).

3.2.2.1.1.2. Types

Roofs in Upper Egypt can be divided in the same two categories as those of Lower Egypt, those which are only made of piled branches and are therefore not suitable to bear heavy loads, and those which are made of a combination of beams, joists, matted reeds and sometimes plastic, a mud layer or even bricks. The description concerning the use of either roof in Lower Egypt –generally animal and storage areas in the case of weak roofs and residential areas in the case of sturdy ones- also applies to Upper Egypt. Less common in the sample were the previously mentioned wooden boards in the place of matted reeds.

However, in addition to these two categories, alternatives were described in the notes that accompany the Old Qurna surveys (Hassan Fathy collection). Both 'wooden boards and palm tree fronds' and 'palm tree fronds and ribs' combinations are mentioned. The survey does not give any details on how each pair of elements was related to each other; presumably, palm tree fronds would be used for matting and laid above spaced wooden boards. As for the palm tree fronds and ribs, it could be assumed that both fronds and ribs were piled together, or most likely that fronds were used to tie the ribs in the matting manner witnessed in Lower Egypt, as seems to be suggested by some pictures of Qurna in the Hassan Fathy collection (b13/199, b13/203). In addition to these, an element not recorded in the other surveys is also mentioned, namely *al-falak*. According to oral sources *al-falak* is said to be a substance taken from the bark of palm trees or other trees. This substance was combined with reeds as another form of cover, as well as being used alongside palm tree fronds, again without the survey specifying the particular relation between both. However, it is possible that *al-falak* would have been used above the reeds or palm tree fronds.

Another difference between Lower and Upper Egypt is the external appearance of the previously described 'beams and matted reeds' roofs. While in Lower Egypt all roofs are covered with abundant branches and/or hay, in Upper Egypt it is more common to have roofs showing their flat surface, without any hay piled on top (Fig. 3.18 top left). Hug's survey described the mixture that was used to cover the roof as a layer of 'coarse lime, ashes and twigs' (Hug 1930, 96), although a more elaborate version of this would have been concrete and a cover of cement or lime. An alternative mentioned by Hug were thick mats laid above the matting to prevent the wood from rotting, as well as a layer of soil or loose stones (Hug 1930, 96). Similarly, Henein (1988, 43) described the matted reeds over the beams in Mari Girgis as being covered by a layer of *muna* (mud and straw) over which bricks forming a zig-zag pattern were laid. The structure was finished with yet another layer of mud (Henein 1988, 43) (Fig. 3.18 top right). A similar roof structure was described by Castel in Qurnet Marei (Fig. 3.18 bottom left). Nevertheless, weaker roofs formed by suspended matted branches, piled branches and/or hay also occur, particularly in animal and storage areas or in economically less able households (Caroline Simpson pers. comm.) (Fig. 3.18 bottom right). In this last instance, hay can also be piled and doubles-up as both roof cover and fodder storage, but this use is not widespread (Caroline Simpson pers. comm.).

No examples of the use of vaulted roofs in domestic architecture were witnessed in Luxor and Qena during fieldwork, with domes being restricted to religious buildings and tombs of *sheikhs* or local saints. According to Hug (1930, 96), vaulted or domed buildings in a domestic context only occurred further south, in the area of valley between Aswan and Esnah, with some recurrence in certain isolated areas of Qus, Sohag, Abnub and Manfalut. However, even in these cases, the questionnaires seemed to show that, in Aswan, for example, only a third of roofs were of this type.

Similarly, none of the buildings surveyed by Hassan Fathy in his survey of 14 buildings of Naqada presented a vaulted roof, with all of them having a flat roof with none or hardly any reeds piled upon them.

It would appear that, within the area of Luxor and Qena, only areas subject to high termite activity would have used vaults instead of timber beams, as recorded by the Qurna Discovery Project (Simpson 2008). However, these are not barrel vaults as such, instead, there are a number of structural arches built off the mudbrick wall, spanning the width of the room at regular intervals thus replacing timber beams to support the roof (3.19 top left and right).

3.2.2.1.2. Walls

3.2.2.1.2.1. Materials

All walls found are of the two types described for Lower Egypt, wattle and daub for certain animal or storage areas and mudbrick for residential buildings.

Wattle and daub walls, as recorded by Henein in Mari Girgis (1988, 41) were made with earth and straw, which was mixed, left for a day and then made into multiple rolls that were flattened by hand. With this, 20-30 cm mud sections were built which were placed above each other until the desired height was reached – for this reason, the separation lines between sections could be seen even after the wall was finished.

The mudbrick making process recorded through this research fieldwork was very similar to that recorded in Lower Egypt, with mud from local soil and also from clearing canals being mixed with straw. According to brick makers consulted during this research fieldwork in Qena, only thin wheat was used for bricks – broken down into small fragments with the help of a machine (Fig. 3.19 bottom left). Only the stem however was used. The process of making bricks (Fig. 3.19 bottom right) consisted in retrieving the mud and the straw and mixing them with water, which was brought up from the subsoil with the use of a pump. Henein (1988, 38) described the mixture proportions in Mari Girgis as being one part of straw for every five parts of earth, which was left to rest for a night and then worked with some water the following day. He also described a palm woven basket which was used to transport the mixture to wherever the bricks were to be made (Henein 1988, 38) although this was not witnessed during fieldwork. Once ready, the brick maker would take some of the mixture with a trowel and place it within the wooden mould. In Mari Girgis, the dimensions of this mould were 17 x 10 x 7 cm (Henein 1988, 39), while in Shenhur the dimensions recorded during fieldwork for this research were 26 x 13 x 8 cm. Regardless of the size, the brickmaker would then smooth the surface and remove the mould. After, he would place the mould immediately next to the previous brick and repeat the process the number of times required. The bricks were then covered with straw and left to dry for several days in the sun, standing them up once solid to speed up the drying process. Hug described the best bricks as being a mixture of clay and sand, with yellow soil (*ard safrah*). To this, some ash and oil could be added to increase their resistance to subsoil filtrations (Hug 1930, 87).

However, Hug (1930, 87) pointed out that the *fellahin* did not usually make the bricks, but instead used a specialist mason who, in turn, had two or three helpers.

Although the presence of marl-clay in Upper Egypt could have resulted in lighter coloured bricks than those made of Nile silt mud and used in Lower Egypt, no obvious difference was seen in this sample between the colour of bricks in the two areas.

As far as the mortar was concerned, Hug's survey described it as having to be sticky; straw and cow dung were added for this purpose. Where possible, lime was also added to the mixture, and the use of lime and sand was, according to him, a characteristic of a well-off owner (Hug 1930, 90).

In this research sample, walls are most commonly rendered with the usual mixture of mud and straw seen in Lower Egypt; to this, ash, cow dung, or ground red brick could also be added, in a mixture called *lisayah* (Hug 1930, 91).

Lastly, the render can be coated with a glue or oil-based paint. On rare occasions, lime could also be used (Henein 1988, 40).

According to Hug (1930, 85), occasionally wood was also used, in the form of beams placed within the wall between brick courses, in corners or near openings, as structural reinforcements. He pointed out that this once traditional use of wood in walls only remained in the houses of well-off owners. It would appear that this trend continued, for during fieldwork no examples were found; most commonly, the examples of wood within walls were extended lintels above doors and windows, as described for Lower Egypt (Fig. 3.20 top left).

Occasionally, full or broken water pots were used in wall building, as will be described below.

3.2.2.1.2.2. Types

According to Henein (1988, 40), wattle and daub walls were used in a minority of cases to build sheds or single-storey structures, with walls becoming thinner - only 10 cm thick at the highest point. This type of wall could also be used for terraces and staircase handrails.

Brick wall making, as recorded during this research fieldwork, did not differ substantially from that practiced in the Nile Delta. Bricks are stacked with mortar used both to join different brick courses and to join bricks in the same course. The most common type of bonding is the common bond, which alternates several rows of stretchers with one of headers, as in the Nile Delta, and the variation in the number of courses of stretchers per course of headers also occurs both between different houses and within the same wall. Nevertheless, the presence of bricks-on-edge at intervals within this bonding seems to be considerably more common than in Lower Egypt (Fig. 3.20 top right), in addition to its covering other structural functions, e.g. roof support, already described for Lower Egypt.

On one occasion, two leaves of bricks were tied together by a layer of matted reeds which sat in a small cavity between them (Fig. 3.20 bottom left).

Pots can also be used in wall building; where these appear in low light walls, they are normally broken or old, although this is not widespread (Simpson 2008). Large-sized complete pots are also used in full walls, in large quantities, with a primarily decorative function. This type of wall usually appears in areas with considerable pottery production, such as Naqada, therefore manifesting the local industry and the re-use of excessive production (Fig. 3.20 bottom right).

Walls are most commonly rendered although some cases were found during fieldwork where walls had been left bare. Walls sometimes showed decorative brickwork, which appeared to be built to be seen and not to be rendered. Painting this render in bright pastel colour was found to be considerably more common than it was in Lower Egypt, especially showing motifs of the Hajj (Muslim journey to Mecca) to welcome returning pilgrims (Fig. 3.21 top), a tradition particularly exalted in Qurna given the presence of artists employed by craft factories to attract customers (C. Simpson, pers. comm.). A Christian version of this tradition was witnessed in Mari Girgis, where Henein recorded motifs of churches on walls to commemorate the visit of an owner to Jerusalem (Henein 1988, 40) (Fig. 3.21 middle).

Other designs are of handprints, especially surrounding the door; this is a superstition associated with the protection of the home (Simpson 2008) whereby the depiction of the five fingers of an open hand provides safeguarding against the evil eye. Blood handprints are also sometimes left by a butcher, with the purpose of commemorating a feast or happy event (such as the birth of a child) for which a sheep has been sacrificed.

The profile of walls was generally straighter than those of Lower Egypt, and no example of walls with sloping façades were found. In Qurna, the façades frequently have a decorative curved upper end which can also be painted in a different colour to the rest of the house (Simpson 2008) (Fig. 3.21 bottom).

Decorative mouldings may appear on walls following the line of the ground floor's ceiling, or above other areas such as windows.

3.2.2.1.3. Doors

3.2.2.1.3.1. Materials

The main material for doors is wood. Wood such as that coming from palm trees, acacias, *nabqah*, *lebbakh*, tamarind and sycamore would have been most commonly used due to the local availability (Hug 1930, 85). The palm tree, for example, would have been used cut into two or four pieces to make a frame for a door (Hug 1930, 85). As in the case of the wood used for beams, Hug mentioned imports of planks from Turkey, Dalmatia or Scandinavia, which would then be put together by the local carpenter, as being available to well-off owners; one of the most common varieties was the white fir tree (Hug 1930, 92). However, from fieldwork observation it would appear that their use has become standard in the present day, perhaps due to the larger volume of foreign imports.

Henein (1988, 44) described most doors in Mari Girgis as being made of jujube tree wood.

3.2.2.1.3.2. Types

Hug (1930, 92) recorded doors as being approximately 175 x 50 cm. However, Castel in his study of the house of the Abd-el Samad family in Qurnet Marei, recorded the dimensions of the front door as 100 cm x 175 cm (Castel 1984, 140), while in Mari Girgis the width was of 120 cm (Henein 1988, 44), proportions more akin to those recorded in Lower Egypt during research fieldwork.

Both types of doors described for Lower Egypt –traditional and western- are also found in Upper Egypt.

Castel recorded a variant of the traditional door with pivot, where the rotating pole was placed between the ends of a forked trunk, which at the opposite end is embedded in a pillar (Fig. 3.22 top). This door also had a small rectangular wooden piece surrounding the socket at the bottom (Castel 1984, 140) rather than the pole being sunk directly into the floor as recorded in Lower Egypt. In the case of Mari Girgis, this piece was made in stone (Henein 1988, 44) (Fig. 3.22 bottom left). The use of this piece at the high end of the pole was also witnessed during fieldwork.

In addition, Hug described doors as opening above an outside 10 cm mudbrick step, also protected with a piece of wood, which helped to close the front door more hermetically (Hug 1930, 93), a feature also recorded during fieldwork (Fig. 3.22 bottom right). In Mari Girgis, a 40cm stone step was used with the same function (Henein 1988, 44).

Castel (1984, 141) also described a two-leafed door of western type, fixed by hinges. The leaves fitted into the door frame by means of t-shaped pegs.

The wooden lock with pronged key described for Lower Egypt is also found in Upper Egypt (Fig. 3.23 top and bottom left). Henein (1988, 44) described those in Mari Girgis as reaching up to 80 cm in width. Castel (1984, 143) described this lock as an external one, only occasionally used inside instead for extra security. This lock was complemented by a simpler variant, which was only secured with a vertical piece of wood (Castel 1984, 144) (Fig. 3.23 bottom right).

In the fieldwork sample, lintels are frequently thicker, longer and more elaborate and decorative than those found in Lower Egypt (Fig 3.23 top). They are also often curved in the middle. In Mari Girgis, these lintels were decorated with crosses or animal horns (Henein 1988, 40).

In terms of decoration, Hug's survey mentioned two elements associated with a door, a fanlight –often arched- and a white plate used to protect the house against evil, both of them located above the door (Hug 1930, 93) (Fig. 3.24 bottom). While the fanlight was recorded during fieldwork in Dendera, the white plate was not witnessed. Hug also recorded door knockers and arches supported by mud columns. They would appear to belong to well-off houses, and not to be a widespread practice, something which was already suggested by Hug (1930, 93). No examples of these were recorded during fieldwork; however, occasionally, an arch decoration in mud bricks or red bricks could be found above the door. Rare decorative details were recorded in Hassan Fathy's Naqada survey, such as large decorative lintels with an arch above on brick or on moulding, brick or stone columns or pillars at either side of the doorway, and other decorative wooden details above doors; these are likely to have been influenced by colonial architectural trends, and were probably not widespread.

Hassan Fathy's survey in Naqada showed several houses to have porches (Hassan Fathy photographic collection b13/018) (Fig. 3.24 middle); however this feature was not recorded during fieldwork.

Finally, some doors in the fieldwork sample did not fill the whole of the door frame at the top, and the space between was covered by a decorative wooden panel.

3.2.2.1.4. Windows

3.2.2.1.4.1. Materials

The same materials seen in Lower Egypt are used in Upper Egypt, with wood for shutters, lintels and frames and metal for grids and bars (Fig. 3.25 top left). Where openings had no windows, they could be covered with branches, as seen in Lower Egypt (Fig. 3.25 top right).

Glass was found as an exception in Hassan Fathy's survey of Naqada (Hassan Fathy photographic collection, b13/104), but these house features appear to be rare as already mentioned.

3.2.2.1.4.2. Types

Hug described the same transformation as Lozach by which windows became larger as owners became wealthier and more influenced by western trends and imports (1930, 92). In contrast, in the 'poor' houses there would be no windows as such, just small openings of around 20 x 30cm in the ground floor and around 50cm from the ceiling (Hug 1930, 94) (Fig. 3.24 bottom). Sometimes an opening could also be found above the door replacing the fanlight, making three or five openings in total.

An opening in the roof was described as having the purpose of letting the smoke out (Hug 1930, 94). However, no examples of this feature were found during fieldwork.

Currently, most houses have the same type of large window witnessed in Lower Egypt, of approximately 85cm x 120cm (Fig. 3.25 top left).

Photographs taken by Hassan Fathy (b13/093, b13/154) during his survey of Naqada houses showed numerous windows of a large size which may suggest that the change explained above had already been widespread by the 1950s, or that these houses were of the first ones to adopt this western-influenced fashion.

3.2.2.1.5. Features

3.2.2.1.5.1. Balconies

Balconies feature in the rich houses of Naqada surveyed by Hassan Fathy; photographs showed wooden balconies, as well as passages across the street joining two buildings opposed to one another (b13/137, b13/81). While balconies were not witnessed during fieldwork, a first floor link between buildings across the street was recorded, but this was also in Naqada (Fig. 3.26 top left). These two features seem therefore to be rare both in Qena and in the area of Qurna (Simpson 2008).

3.2.2.1.5.2. Pigeonhouses

Hug described them as two or three mud blocks, separated by lanes or slits, forming the shape of a truncated pyramid over a roof of palms or boards (Hug 1930, 154) (Fig. 3.26 top middle). Each block was approximately 75cm-100cm high separated from the one above by red brick, to provide stable foundations for the mud masonry. Within the masonry, thick-bodied pots were embedded, with their bottoms facing out. Twigs protruded out of the wall and acted as perches. At the bottom of each compartment a large opening was pierced, reinforced by cylindrical tubes. At the very top, a row of pots finished off the construction (Hug 1930, 154).

In addition to these, small, independent mud structures to house pigeons were also found. These were rounded, with compartments on one or two levels. Each cell served as a nest for a pair of pigeons. They had holes in the upper section for ventilation, an opening to allow the pigeon in and another one to put water and seeds and for cleaning, usually closed by a wooden trapdoor (Castel 1984, 148) (Fig. 3.26 top right).

A variety of these are the poultry shelters (*bayata*), circular mud structures with randomly placed small holes for ventilation. They also have a wide opening at the top to allow chickens in, which is normally covered (Castel 1984, 148).

3.2.2.5.1.3. Mastabas

No examples of mastabas were recorded during fieldwork in Qena, where they were most commonly replaced by wooden or woven benches, with the same social function described for mastabas in the Nile Delta (Fig. 3.26 bottom right). In addition to this function, Castel described them as being used for sleeping during the day and to lay the bread to rise before it was baked (Castel 1984, 124). In contrast, according to Caroline Simpson (pers. comm.), mastabas used to exist in about a third of the Qurnawi houses, although some of them were located in courtyards (Fig. 3.26 bottom left). More often than not though, these mastabas formed part of meeting buildings such as *mandara* or *zawiya* and not the house itself, in accordance to their community gathering function. Where mastabas featured outside houses, W. B. Boutros (pers. comm.) suggests that these could have been the result of houses that had little internal space where people could talk, or households that could not afford wooden benches. Simpson (pers. comm.) however is inclined to rule out a correlation between the presence of mastaba and wealth, status or age of the house, and suggests family preference as the cause of its recurrence.

3.2.2.1.5.4. Drainage barriers

No drainage barriers were recorded in fieldwork or are mentioned in any of the published sources used for the research. However, C. Simpson (pers. comm.) recalls having seen similar barriers exclusively in Geziret el Qurna, a village which used to become an island during the Nile’s annual flood. This was associated with steps going down into the house, a feature which is also absent in other Upper Egyptian villages. This supports the idea that this feature was developed as an answer to certain environmental circumstances, namely the need to protect the entrance from water, and consequently born from a topographical rather than geographical circumstance.

3.2.2.2. Interior finishes

3.2.2.2.1. Ceilings

3.2.2.2.1.1. Materials

The same materials that are witnessed in Lower Egypt are also present in Upper Egypt.

3.2.2.2.1.2. Types

The types are the same as those described for Lower Egypt; however, they are more commonly plastered with mud and painted, including the beams (Fig. 3.27 top).

3.2.2.2.2. Walls

No significant differences with Lower Egypt have been found for interior wall materials and types.

3.2.2.2.3. Doors

No significant differences with Lower Egypt have been found for interior door materials and types.

3.2.2.2.4. Windows

Windows of a similar style to external ones were recorded during fieldwork (Fig. 3.27 bottom), but which lacked metal bars and grids due to the absence of need for security. In addition, openings without windows were also found in the interior of the house of the Abd el Samad family described by Castel (1984, 144), although these could sometimes be associated to windows below them. They were often two in number, located under the ceiling in opposed walls and provided light and air, as well as a way for pigeons to move between rooms. These openings were also recorded in Mari Girgis, where they were only found in the upper storey, and were uncovered in the summer and blocked with a basket in the winter (Henein 1988, 44). Only courtyards or stables lacked these openings in the house of Abd el Samad in Qurnet Marei (Castel 1984, 144).

3.2.2.2.5. Others

3.2.2.2.5.1. Floors

Floors are most commonly unpaved across the sample, covered in irregularly flattened earth. A particularly pronounced irregularity can sometimes be found in the 'living room' area, where a small 'basin'-like shape can be dug in the floor which can be filled with water to help cool the space, according to oral sources. In well-off houses, tiles can be found, usually covering entrances and/or reception rooms. Red brick floors and cement tiles were found in the entrance room and hall of Qurnawi house 23 of the Hassan Fathy survey.

3.2.2.2.5.2. Mud containers

It would appear that Upper Egypt is particularly rich in a variety of mud containers, or at least, that this building tradition has survived better than in Lower Egypt.

In addition to mud containers with storage and animal-feeding purposes, a number of other containers with varied functions can be found. Amongst the storage ones is the *safat*, described by Castel (1984, 147) as a mud container supported on stones or bricks, which can be varied in size (Fig. 3.28 top). It was usually made with clay, donkey dung, lime, sand and salt. They could be easily modified, e.g. new shelves added. It could be moved to different places thanks to its dimensions; for example, it could be used in the middle of a courtyard or against a wall, or to support a light roof of the type described for animal and storage areas. The dimensions of these could vary between 76 x 80 x 100cm and 146 x 150 x 200cm, therefore nearly square (Simpson 2008). A variant of these have a jar-like shape, stand on stones or bricks; they can have one or two openings and are closed with a flat top (Simpson 2008).

Another container recorded in Mari Girgis was the *hoha*, a type of cylindrical silo (*dor*) for corn or wheat, with one or two cupboards above (Henein 1988, 52) (Fig. 3.28 middle).

Other containers can have additional functions, such is the case of the *menama*, a mud structure which in addition to serving as a cupboard, can be used as a bed, a child's playpen or as a chicken coop (Simpson, 2008). One fundamental function in the past was to enable children to sleep safely, protected from scorpions. Henein

(1988, 51) also recorded the *nawwama*, a similar structure which doubled up as a bed and a storage container for corn and wheat (Fig. 3.28 bottom). Both the *hoha* and the *nawwama* could be incorporated into the walls and be used for additional support of weak roofs (Henein 1988, 52).

Simpson (2008) also described this variety of containers in Qurna as being incorporated into the wall, sometimes forming complete internal walls. These could also be found in the tomb areas around which these houses were built. Winlock (1926, 52) referred to them as being made of 'a mixture of Nile mud, manure and straw, well-rotted together' which became really hard when dry.

3.2.2.2.5.3. Pigeonholes

Pigeonholes were recorded during fieldwork, with the same function and shape as those in Lower Egypt. However, some were also described by Castel (1984, 148) as protruding from the façade (Fig. 3.29 top). These would have been mud additions, where the pigeons would have nested, as opposed to piercing holes in the wall.

3.2.2.2.5.4. Niches

Niches serve the same storage function as they do in the Nile Delta, and are as common. Castel (1984, 144) described them as originally being built for specific functions: holding a lamp (most commonly in the case of a niche next to a staircase as seen in Lower Egypt) (Fig. 3.29 bottom), or other objects such as house keys, trays and teapots, despite the fact that they might have ended up being used for general storage.

3.2.2.2.5.5. Staircases

Two types of staircases are found in Upper Egypt, suspended staircases and full staircases of the type described for Lower Egypt.

Suspended staircases were found during fieldwork, which rested on a tree trunk upon which matted reeds were laid –sometimes with a sheet of plastic in between- and over these, steps were built in mudbrick/red brick and rendered with mud (Fig. 3.30 top left).

This same technique was used in Mari Girgis, according to Henein, to support a section of a full staircase – of the type described for Lower Egypt- directly over a cupboard or small storage room. A smaller portion of a tree trunk was used as a lintel, over which matted reeds were laid (Henein 1988, 46), but only on the area above the cupboard (Fig. 3.30 top right). Externally, the staircase had the appearance of the full staircases described for Lower Egypt, with brick steps and wooden front trims. However, these wooden trims could appear on the side instead, or both on the front and on the sides, protecting them from erosion (Henein 1988, 47) (Fig. 3.30 bottom left). These full staircases could have a low mud wall acting as a handrail or, exceptionally, timber handrails.

Lastly, a version of the suspended staircase was recorded in Mari Girgis (Henein 1988, 46) (Fig. 3.30 bottom right). The structure was the same as that described above; however, the tree trunk –halved or squared- was laid with its pruned branches looking up, and the gap between them filled with a mud and straw mixture. The steps were made of the same mud and straw paste. This type of staircase was very weak and normally only used to access the terrace.

3.2.2.2.5.6. Ovens

The round bread ovens continue to be the most used mud structures today. They used to be made by hand by the house women (Castel 1984, 150; Henein 1988, 153), but are now most commonly bought in their basic shape and then moulded into a specific place (Simpson 2008).

Castel (1984, 150) distinguished the following parts (Fig. 3.31 middle): the hearth, built in mudbrick, which supports the baking chamber (1); the arched oven opening, located on the side of the oven to feed the fire (2); the baking chamber (3), built by women with mud paste and with an opening to allow the flame through (4), serving as a chimney and increasing the air flow; the bread opening; two small openings (5) on the oven wall to observe the bread while cooking and regulate the temperature; a top opening to allow air and also regulate the temperature (6-7). The parts of the oven were identical in Mari Girgis (Henein 1988, 153-158). However, Henein described an additional part, created by the difference in circumference between the hearth and the baking chamber (8); this gap was used to rest and cool down the newly baked pieces of bread.

To build the oven, the oven chamber was placed on top of the hearth, and covered with a mud layer. Once built, it was covered with cow dung and lit for five to six hours; then, it was closed for two days (Castel 1984, 152). Its first use was usually celebrated with a party. The fuel used was maize stems, while dung patties kept the temperature (Castel 1984, 152). Ovens could be decorated with hand prints to ensure protection, as well as sometimes dolls which can be painted in ochre and decorated with eggshell (Castel 1984, 152). In Abd el-Samad's house, the oven was completely rebuilt every year.

Other structures made of mud were braziers and stoves (Fig. 3.31 top and bottom). In Qurnet Marei, the stoves had two red brick or stone stands on which to place containers and a hearth in the middle for the fire (Castel 1984, 152). Henein (1988, 159) described a different type of stove, one that had two orifices, a larger one for larger containers and directly fed by fire, and a smaller one for plates. A bar of iron to hold dishes was placed between the two openings and rested on the wall. Prior to building the stove, the villagers threw salt, black cumin and wheat for luck (Henein 1988, 160).

3.2.3. Dakhleh Oasis

3.2.3.1. External finishes

3.2.3.1.1. Roofs

3.2.3.1.1.1. Materials

The materials are the same ones as those used in the first two areas, namely palm or acacia wood, branches and mud.

3.2.3.1.1.2. Types

The main types of roofs described so far are also found in Dakhleh. The most common roof is the 'beams and matted reeds' roof previously described, made of acacia beams or palm logs, most commonly split in half. These beams are usually spaced 60cm apart and can protrude from the façade as seen in Lower and Upper Egypt (Hivernel 1996, x).

The usual mat of palm ribs is placed above. These ribs are tied with ropes, although the latter can be replaced with palm rib wickerwork, intended to be decorative

(Schijns 2008, 25). Above this matting, a layer of palm leaves and finally one of mud or bricks is usually laid, with a flat finish. These roofs do not usually span an area wider than 3.5-4m and are the types chosen when the intention is to build terraces above. These terraces are flat and usually interlinked allowing passage between them (Hivernel 1996, 23).

The weaker roofs made from branches are also found here in storage and cooking areas, but not normally where a second storey is to be built due to their poor strength. These roofs usually adapt the form of some thicker main branches over which smaller ones are thrown, and can be finished with or without a coating of mixed mud and straw (Hivernel 1996, 142). Sometimes this coating can be substituted by further palm leaves and straw.

The external appearance is always flat, without hay piled on top.

3.2.3.1.2. Walls

3.2.3.1.2.1. Materials

The materials are the same as described before, namely mud and straw for bricks, mortar and render, as well as lime for the latter. However, palm branches and mud are also used together for wattle and daub fences and roof terrace low walls (Schijns 2008, 23; Hivernel 1996, x) (Fig. 3.32 top). The size of the bricks is usually 21 x 12 x 7cm, although they can also be larger (Schijns 2008, 23; de Filippi 2006, 5). The colour of the bricks is considerably lighter due to its sand content, which results in structures presenting a different appearance to those in Lower and Upper Egypt. The bricks are laid with a clay and sand mortar.

Wood is also used for structural reasons, by means of beams inserted between brick courses, which can be elaborately carved (de Filippi 2006, 5).

3.2.3.1.2.2. Types

The size of walls can vary between villages. The outer walls are usually two brick courses thick, amounting to 40-50cm, although the walls of upper storeys are usually just one or one and a half brick courses in thickness (Schijns 2008, 23; de Filippi 2006, 5).

The most common type of bonding in al-Qasr is the so-called English bond, which alternates one course of stretchers with one of headers (type A1 of Spencer's (1979) brick bond corpus) (Fig. 3.32 bottom left), although courses of only headers can be found in monumental entrance façades or as decoration, for example above window frames in the shape of arches (Schijns 2008, 23). However, another type of bonding, in Balat, alternates one course of brick on edge with one of stretchers (type C1 of Spencer's (1979) brick bond corpus) (Hivernel 1996, xiii) (Fig. 3.32 bottom right).

This bonding is most commonly just rendered at the ground floor level, while in the upper storey the brickwork is shown. This can often be decorative, with triangular decorations whether in the bonding or closing openings (Fig. 3.32 bottom left).

The rendered parts have several layers: a thicker layer of mud plaster (mud and chopped straw), a finer layer which requires constant maintenance and sometimes, a whitewash, which can also be painted, for example with Koranic inscriptions arranged in bands or drawings of the Hajj (Schijns 2008, 25). This appears to apply to both al-Qasr and Balat (Hivernel 1996, xix-x). This render also covers the mastabas or mud benches, giving the appearance that they are a continuation of the façade (Fig. 3.34 middle).

Even though the upper storeys are not rendered, the area around windows is usually rendered with the same mixture as the ground floor (Hivernel 1996, xix, xi) (Fig. 3.32 bottom left).

Other decorative element found in walls can be carved stonework, reused from nearby archaeological sites (de Filippi 2006, 5).

The profile of the wall is commonly curved outwards towards the bottom, probably due to repetitive repairing.

As well as mudbrick walls, which are used for residential buildings, wattle and daub walls can be used for animal or storage buildings (Hivernel 1996, x), or for low walls in the terraces of residential buildings (Schijns 2008, 23).

3.2.3.1.3. Doors

3.2.3.1.3.1. Materials

They are the same as those seen in Lower and Upper Egypt, but wood from palm trees is particularly common in Balat (Hivernel 1996, 140-143) while palm and acacia wood is more frequent in al-Qasr (Schjins 2008, 22).

3.2.3.1.3.2. Types

Doors are of the traditional type described (Fig. 3.33 top left), with western-type doors being uncommon. These doors pivot on a pole which is inserted in the lintel and the threshold, and have a traditional wooden lock (Schijns 2008, 25), as seen in other areas (Fig. 3.33 top right). Doors can be made with flat wooden boards which can also include reused inscribed lintels (Hivernel 1996, 33) (Fig. 3.33 bottom left). These are crossed transversally by rough pieces of wood hammered to them, and which can be inserted into the pivoting pole. Wooden ordinary lintels above doors can extend into the masonry, as seen in other areas. A particularity of lintels in the Oasis is that those placed above main doors giving access to family areas, are thick decorative lintels inscribed with the name of the artisan, the date and the family lineage, with some of them dating back to the 18th century (De Filippi 2006, 5) (Fig. 3.33 bottom right).

The doorway is usually reached after descending a small number of steps from the street level (Schijns 2008, 24). A particular feature of the Oasis is the fact that thresholds are rendered with a round finish, creating the illusion that the bottom of the door is actually round (Schijns 2008, 25; Hivernel 1996, x) (Fig. 3.34 left).

Doorways can be decorated by carving areas in the shape of a triangle above the lintel – or sometimes above a fanlight-, (Fig. 3.34 middle) or with an arch framing the door and extending at both sides of the door (Hivernel 1996, x, xiv).

3.2.3.1.4. Windows

3.2.3.1.4.1. Materials

The main difference with the other two areas is that metal bars or grilles are not present in the Oasis openings and windows, with wood being the only material used for lintels, shutters, bars and even grilles. Glass does not feature either (Schijns 2008, 27).

3.2.3.1.4.2. Types

The openings can be very small, sometimes just slits. Windows can have frames of various shapes. A common window in al-Qasr has wooden crossed bars dividing four wooden shutters (Schijns 2008, 18) (Fig. 3.34 right). Windows can also be covered with wooden screens, sometimes formed by thin pieces of wood crossed diagonally, similarly to *masharabiya* (Hivernel 1996, 22; de Filippi 2006, 3) (Fig. 3.35 top left).

The openings tend to be located on the top floor, while the ground floor is only pierced by the door (Hivernel 1996, ix). Where these are present in the ground floor, they usually are located c.150cm from the ground. A tradition was to block them with large baskets during sand storms (Hivernel 1996, 140), in the same way as was described by Henein in Upper Egypt.

Similarly to doors, lintels for windows may extend into the masonry. Equally, as seen in other areas, one piece of wood can be used as lintel for several windows. In addition, as seen in the case of the doors, the bottom of windows tends to be plastered in a round shape (Schijns 2008, 128).

3.2.3.1.5. Features

3.2.3.1.5.1. Mastabas

These are usually similar to those seen in Lower Egypt, but they are usually rendered with sand in the same fashion as the ground floor, making them look as a natural continuation of the façade (Hivernel 1996, x). They generally have a more regular finish and protrude more into the street than their counterparts in other areas (see Fig. 3.35 top right).

3.2.3.1.5.2. Pigeonhouses

Pigeonhouses are a feature in the Dakhleh Oasis, however there tend to be separate buildings dedicated to this, while the provision of pigeonhouses on top of individual houses is not common. This might be related to the laws banning people from building houses higher than their neighbours' (de Filippi 2006, 4).

3.2.3.2. Interior finishes

3.2.3.2.1. Ceilings

Ceilings are flat and correspond to the roofs described; beams and matting roofs appear to be commonly not rendered. Vaulted ceilings do not feature in the Dakhleh Oasis (Schijns 2008, 25).

3.2.3.2.2. Walls

Inner walls present no fundamental differences in construction with those of Lower and Upper Egypt; however, their different appearance is caused by the light colour of the render – due to the reasons explained above- as well as the custom of repetitively rendering the inner walls, which gives them a rounded aspect around the edges of features such as windows and doors (Schijns 2008, 25). Due to this heavy rendering, no carved timber is visible of the kind described in the façades.

3.2.3.2.3. Doors

Most of the doors are made with palm wood or rough wooden boards, and can have wooden locks (Hivernel 1996, 140).

In some cases, doorways without a door can be found, for example giving access to a kitchen area (Hivernel 1996, 141).

3.2.3.2.4. Windows

3.2.3.2.4.1. Materials

Only wood is used – from palm tree or acacia –, without metal bars or grilles.

3.2.3.2.4.2. Types

Interior windows are similar to exterior ones in that they are of a small size (20 x 26cm, 23 x 40cm) and are usually located at a similar distance from the floor (150cm). They do not always have a full frame but they usually have a lintel and they can be covered with wooden bars (Hivernel 1996, 141).

3.2.3.2.5. Others

3.2.3.2.5.1. Floors

All floors are made of flattened clay and covered with sand (Hivernel 1996, 140). Sometimes stone can also be used for flooring (Schijns 2008, 22).

3.2.3.2.5.2. Staircases

Full staircases are most common, with treads that have a rounded aspect due to use and plastering, and which are finished with a wooden or palm rib trim. This structure is held on a slanting floor supported by round casuarina wooden beams. A storage space *(hanut)* of the kind seen in the other areas, making use of the staircase body, is commonly found (Schijns 2008, 25). Often, a depression for placing a water jar is dug at the side of the staircase (Schijns 2008, 26) (Fig. 3.35 bottom left).

3.2.3.2.5.3. Mud containers

Mud containers are normally situated on the roof terrace around the stairwell (Fig. 3.35 bottom right). These containers are of a similar kind and use as those found in other areas, elongated rounded mud bins with flat lids to cover them. Sometimes, they also have other holes in them, which can be covered with clay once the bin has been filled up (Schijns 2008, 24).

3.2.4. Comparative summary

Both types of roofs described, sturdy and weak, are present in the three areas, and are given a similar use; weaker roofs are usually present in animal and storage areas, although they may also be used regardless of room function when sturdy roof building is not possible financially. The main difference resides in the external finish of the sturdy roofs; whilst in Lower Egypt the majority of roofs are finished with branches and/or hay piled on top of a flat surface, in the other two areas this covering is extremely rare. In Upper Egypt and Dakhleh Oasis, there is also a higher proportion of unroofed rooms. The main explanation given by oral sources for such differences is the fact that precipitation in Lower Egypt is more abundant, hence the presence of a thick roof providing the required protection from the rain.

The use of wattle and daub for walls is confined to low fenced areas, such as pens, in all three areas, with the exception of the Dakhleh Oasis in which this type of wall is also used for terraces. House walls are therefore almost ubiquitously built with mudbrick. However, there seems to be a certain degree of randomness in the bonding arrangement within each geographical area, which results in several types of bonding being used. In any case, brick-on-edge appears often to be used as structural reinforcement for roofs or openings across areas. Similarly, the colour of the bricks varies both within each area and between areas; this is particularly noticeable in the walls of Dakhleh Oasis houses which are lighter than any of the colour variations witnessed in the other two areas; the reason for this difference is the higher proportion of sand found in the soil of this desert location. In terms of the manufacturing of bricks, the process followed is similar in all the locations studied within the three areas; the main difference is the exact size, but this size can also vary within the same area as seen in Upper Egypt and seems to reflect the masons' preferences. In all three areas, mud mortar is used to stack bricks together. The proportion of straw in the rendering can vary within the same area giving walls a different aspect; however this variation is more easily identifiable in Lower Egypt given that the majority of façades in Upper Egypt are painted over the render. In Dakhleh, however, there is a tradition whereby the top half of the façade remains not rendered, showing the brickwork, while the bottom half is whitewashed. The two halves are usually separated by triangular brickwork decorations. Where walls are painted, a tradition of decorating the façades with drawings portraying the Hajj pilgrimage is shared across areas.

In all areas, both traditional and Western-type doors are present; in Dakhleh, however, traditional doors are widespread, most likely due to the geographical isolation of the place and recently to the laws banning alterations to traditional houses previously mentioned. Locks are similar in all places but their specific features depend on the amount of security that the owners feel is needed regardless of the area; the position of locks with a pronged key inside or outside the front door also responds to the level of security wanted. Arches or buttresses around main doorways play a decorative, structural and protective role, ensuring the safeguarding of the house. On the other hand, features such as fan lights are related to practical requirements, for example house ventilation.

Windows are similar in Lower and Upper Egypt, with a combination of large wooden windows and openings covered by branches; in the Dakhleh Oasis, however, there are also traditional large grid windows which are not witnessed in the two other areas.

As for other external features, drainage barriers appear only in areas susceptible to flooding prior to the build of the dam, that is, in the Delta and specific locations in Upper Egypt.

Balconies are rare; their presence could be linked to architectural trends which, it should not be forgotten, would have also occurred in the history of mudbrick houses, and whose presence in rural areas might be influenced by the same social processes that prompted the appearance of red brick, that is, a sign of affluence. Structures dedicated to the breeding and keeping of pigeons whether external or internal (in Lower and Upper Egypt) are ubiquitous, reflecting the importance of these birds for food and the production of fertiliser.

Mastabas are present in all three areas, reflecting Arab traditions regarding the importance of hospitality and of having a socialising space open to the community. Ovens are also found in the three areas**,** indicating the habit of each household of producing their own bread.

The differences in internal features are not substantial, aside from certain local features, particularly in Dakhleh, such as the presence of a space for a water jug next to the staircase. In the three areas, mud containers are a prominent feature, although in Lower and Upper Egypt they sometimes have an added structural function which appears to be lacking in Dakhleh.

Suspended staircases feature in Upper Egypt alongside solid staircases, while in Lower Egypt and Dakhleh only the latter appear to be present. Floors are commonly not built up in all areas. Niches are common in the three places; in addition to the niche practicality for economising space, they also perhaps reflect difficulties for acquiring furniture. When located on the side of staircases they are an indication of the low natural light level conditions, which meant that traditionally oil lamps were required.

3.2.5. Alteration of architectural features

All the features described above, regardless of the area in which they are found, are potentially subject to a series of processes whereby they can be modified.

If we understand buildings as material cultural expressions (Tilley *et al* 2006, 1, 4), the four processes in the life of an artefact (maintenance, lateral cycling, secondary use and recycling) can be applied not only to the objects within the mudbrick house, but also to the building itself (David and Kramer 2001, 93 based on Schiffer 1976, 27-41).

Firstly, use can be followed by 'maintenance'; this means that the artefact's aspect is modified, whilst continuing to have the same function. Secondly, the object can be involved in 'lateral cycling': its ownership changes, but its function and use remain the same. Thirdly, the artefact can have a 'secondary use': the user might be the same or different and the object does not change aspect extensively, but it is used for a different purpose. Lastly, it might enter into a ‘recycling process’: the user might be the same or different, but the object is transformed into something else to fulfil a different use. Although all four are applicable to the life of a building, maintenance and recycling appear to be the most frequent in mudbrick houses.

Maintenance takes place in mud buildings through the act of repairing and re-plastering of inner and outer walls, as well as floors. Regular maintenance is essential for the long life of organic buildings (Baloi 2001, 49) given that their material substance is particularly vulnerable to the elements. Through this maintenance process, the aspect of the building is modified, however the function remains unaltered. This modification can, nevertheless, leave a trace in the archaeological record through the preservation, for example, of a thick layer of floor, which can be misinterpreted as a sign of long occupation (Weinstein 1973, 275).

Recycling – both of the objects and of the building areas in which they are contained – is also a fundamental process occurring in the mudbrick house; this is particularly encouraged by the organic nature of their materials, which means that both a number of artefacts – such as storage containers and ovens – and house features are susceptible to being recycled. This may lead to confusion in the interpretation of such artefacts in the archaeological record.

In addition to this intentional recycling, a passive process can take place which involves both maintenance and recycling; as McIntosh (1974, cited in David and Kramer (2001)) pointed out, buildings that use earth as a material are likely to incorporate older artefacts into them while maintenance processes are carried out, therefore recycling those artefacts.

Consequently, maintenance and recycling are dynamic processes in the mudbrick house. Their archaeological relevance is the necessary realisation that the archaeological record is a reflection and usually the end-point of the processes which occurred during the lifespan of both artefacts and building, and as such it is not static. From a practical point of view, this also implies the inclusion of short-term change processes in the interpretation of the different phases of a settlement, despite the fact that this is likely to obscure the identification of such phases (David and Kramer 2001, 97).

As for the other two processes, lateral cycling and secondary use, the object does not change purpose through 'lateral cycling' but it changes hands; on the other hand, despite the artefact being designed with a particular function in mind, it can later be given a different use through 'secondary use', even if its physical appearance might remain the same.

These processes demonstrate that architectural features do not stay static throughout time; instead, they are subject to practical alterations linked to their material.

3.2.6. Conclusion

Architectural features can be grouped in four categories, according to their main function: structural, adaptive, practical and decorative. Needless to say, features can combine several of these functions and do so in many cases.

Structural features, such as walls, contribute decisively to the physical integrity of the house; adaptive features are developed to adapt to the surroundings, such as the drainage barrier; practical features, such as the lamp niche, are those which are not essential to the integrity of the house but are developed as a response to particular needs, and finally decorative features can be defined as those whose main purpose is merely that of being ornamental, although they often are a vehicle for the expression of identity in various forms.

The external and internal features recorded across mudbrick houses in Lower Egypt, Upper Egypt and the Dakhleh Oasis, do not differ substantially. Variation in structural features between areas appears not to be reflecting significant differences in feature function and performance, but rather local material availability, suitability and tradition.

In the sample there appears to be a vast majority of houses with similar structural features, with the exceptions seemingly being at either end of the economic spectrum; on the one hand, affluent houses could have columned entrances (porches) such as those surveyed by Hassan Fathy in Naqada; on the other hand, households with very little economic means may not have roofs at all. When dealing with structural features, the potential influence of economic factors reflects in the quality and elaboration of the architectural feature in question, rather than in the actual presence or not of certain features.

Overall, the highest degree of variation between the Nile Delta and Upper Egypt is seen in the decoration of features and not in structural features, while Dakhleh houses are more distinct both in their decoration and in their structure. In any case, decoration features appear to be a vehicle of cultural expression manifesting religious or local traditions as opposed to being a reflection of social differentiation (for example drawings of the Hajj appear in houses across the sample with independence of the degree of elaboration of other features), although the state of maintenance of, for example, paint, may be reflecting such differences given that lack of economic means might reduce or stop essential maintenance.

The implications of feature types for the analysis of the archaeological record will be fully developed in chapter 5 ('Interpretation').

3.3. Distribution and use of space

3.3.1. Introduction

The aim of this section is to provide some alternative theoretical concepts to the ones that have been taken for granted in most previous studies of distribution and use of space in ancient Egyptian houses; these proposed concepts are based on ethnographic literature as well as individual fieldwork and are the basis of the practical study in this section, which is focused on the identification of activities as opposed to rooms. The exception to this focus is the courtyard, a space where multiple activities take place, but which is singled out given the structural significance which it has often been given in the interpretation of ancient Egyptian domestic architecture (see section 2.1.1).

With this purpose, this section will analyse modern house activities in order to identify any possible trends in the use of space. It will also examine house layouts to detect any possible patterns in the distribution of space as well as the degree of variation of such patterns between houses of the same and different areas. This also aims to test the assumption that there are a number of specific layouts which houses conform to, and that the use of space necessarily has a physical reflection, assumptions that have formed part of previous interpretations of ancient Egyptian domestic architecture.

3.3.2. Towards a comprehensive interpretation of space use

Three processes which have been identified as being relevant for the interpretation of space use will guide the interpretation of the modern material; the notion of 'predominant use' vs. 'function', the influence of cultural determinants, and the concept of short and long term use of space.

3.3.2.1. The notion of 'predominant use' vs. 'function'

In section 3.2.5, four processes were described which could affect the building and its features, maintenance, recycling, lateral cycling and secondary use. This last process referred to an artefact designed with a certain function, which was later given a different use.

This process has relevance for an important distinction also applicable to the interpretation of house rooms, that between 'function' and 'use' (Kamp 1993, 307), where a certain feature or artefact found in a room might suggest a given function. However, the use that is *de facto* given to that same room whether simultaneously, at different times of the day or of the year or over a longer period of time, might not necessarily correspond with its original function. A second concept, central to the interpretation of the archaeological sample, is that of the predominant use of the room, which does not exclude other uses; the possibility of two activities taking place in the same space is culturally determined and must therefore be studied outside the limitations of our current western understanding. For example, the modern material showed that the use of a room for cooking and sleeping was compatible (see document 9, interview 1, question 18).

While some activities are more difficult to identify due to the fact that they do not leave an organic trace, such as sleeping, in which case, the sole consideration of the presence of artefacts might be unavoidable, many others can be indicated by the composition, relative density, artefact clusters and other remains, as well as the relative space dedicated to them (Hardin 2004, 74).

Within these organic traces are included microartefacts (culturally significant particles of less than 2mm diameter (Kontogiorgos and Leontitsis 2011, 643)) which can give clues towards the activities carried out on the spaces where they were found, once the natural and cultural process affecting the archaeological record after the destruction of the structure have been identified and excluded as the origin of such remains (Hardin 2004, 74). Nevertheless, the absence of certain microartefacts and indeed of larger organic remains can also offer an indication of the use of the room; Kamp (1993, 309) remarked that rooms that are usually litter-free tend to be sitting rooms, good storage and food storage rooms, and sometimes kitchens and courtyards, which can be regularly cleaned. In rooms where hay storage and animal keeping takes place, small pieces of refuse appear scattered.

In respect to the repetitive relation between activities and particular rooms, it is worth mentioning that ethnographic research shows that there is not always a necessary correlation between similar size, architectural features, position and access to room and the activities there undertaken (Kamp 1993, 307).

On the other hand, room 'use-wear' might provide some indication about the character of activities, e.g. blackening of walls and ceiling might indicate the presence of fire, but whether this is an indication of the use of this fire to cook or for warming purposes can be harder to determine (Kamp 1993, 308, 309).

3.3.2.2. The influence of cultural determinants

Two topics usually explored within the analysis of space in domestic architecture, including archaeological remains, are the distinction between public and private areas, and gender segregation. However, neither process might necessarily leave a physical trace.

Private and public area separation in many Egyptian rural mudbrick houses, e.g. in the northwest Delta, is hardly noticeable physically, with the main door giving access to a hall, and visitors briefly passing through this hall to access the reception room (Reynolds 1994, 167). Women usually do their chores in this hall, but must leave this visible area when visitors arrive and retreat to other rooms. Therefore this social requirement can take place without leaving a physical trace, and it is the people's movement that defines the space rather than it being physically defined.

Domestic gender segregation can be, in practice, more lax than expected or vary depending on the circumstances. For example, the *mastaba*, a mud bench attached to the façade, is used in the Northwest Delta as an external place to socialise and, therefore, somehow represents a transition point between public and private spheres of life. It can also have a gender attribution depending on the moment of the day; during the day, it is used as a seating spot and as a place for neighbour interaction by women and children; however, at night, the *mastaba* is usually reserved for males on their return from work (Reynolds, 1994, 168). This original arrangement can however be altered in practice, with women staying around to greet the village men that come back from work, or even sitting with men on the bench occasionally (Reynolds 1994, 168).

Therefore, independent of the existence of a gender attribution of space, this attribution does not necessarily always show on the physical distribution of the house. In addition, acknowledging the dynamism of social relations, which are affected by economic and social factors across time, is crucial to understand that the living experience of gender divisions is not as rigid as it may seem (Ali 1998, 166).

The use of space is determined culturally, which means that the coexistence of different activities in the same room is also culturally dependent. The concept of privacy and the distinction between public and private spaces are also culturally determined concepts.

Public activities need specific physical settings, which lead to a certain degree of standardisation (Kamp 1993, 300). In the modern mudbrick houses researched, an example of this could be seen in the almost ubiquitous presence of reception rooms, which were a reflection of the importance of the concept of hospitality, as will be described in section 3.3.3. However, in private rooms, standardisation might happen to a lesser degree, as there is more emphasis on functionality as well as more room for individual aesthetic developments (Kamp 1993, 300). The difficulty resides in establishing what is considered private and public within each human group. This is determined by the balance between 'the importance of the activity as public display and the cultural mandate of privacy' (Kamp 1993, 300). This transition between the public and private spheres of life must be done progressively (Gazzard 1986, 20).

A distinction between frontstage and backstage activities can be made whereby all but the most intimate activities may be performed frontstage at some point. The frontstage rooms usually have better architectural features, such as the sitting or living room and goods storage (Kamp 1993, 305); this was also observed in the reception rooms of the modern data sample.

Gender segregation is materialised in the provision of certain areas where women are protected from the sight of strangers; in the traditional Islamic house, the main private area which needs protection from the public view is that of the *harim* or women's apartments (Gazzard 1986, 23) (see Appendix, Document 1 for similarities and differences between the traditional courtyard house and the rural Egyptian house). Furthermore, it would appear that the apparent generic gender segregation and public-private separation is also influenced by the characteristics of both the owner and the visitor, for example, an order from someone in a position of authority exerted through either family ties or status, might mean that a visitor may be allowed into areas that would not be normally accessible to strangers. For example, during fieldwork observation in Naqada (Upper Egypt), I was allowed into houses by the head of the village without previous warning and was shown around all areas of the house freely in the presence of members of both sexes. This shows that particular circumstances, such as the authorities' sanction of the visit or the visitor's background can also alter the usual rules regarding gender and private/public division; the owner of SUR01 in Surad expressed this reality in her answer to question 19 concerning areas not accessible to strangers, by including the room where the interview was taking place (see Appendix, Document 9, interview 4).

The bias derived from the particular characteristics of the interviewer (in this case, a foreign woman, accompanied by someone from the village) appears to show that the particular social relations established within the village, most commonly reflecting status differences whether within the extended family or related to position within the community, can influence the gender and private/public sphere definition.

It is worth noting though that, despite these exceptions, in most cases the bedrooms were a forbidden area for ordinary guests who were not close relatives, as was shown in the interviewees' answers to questions regarding privacy (see Appendix, document 9, question 19 across all interviews).

The archaeological relevance of these considerations is that the separation between private and public areas and gender segregation might not always necessarily have a physical influence on the distribution of the house and that, where one exists, it does not imply a permanent use of the space in that manner.

3.3.2.3. Short and long term diachronic use of space within the house

As a basic consideration of this study, it is assumed that there is no invariable relationship that will infallibly identify the presence of an object with a certain room type (Kamp 1993, 308). One of the reasons behind this is the diachronic character of the use of space, which is subject to changes in the short term (daily and seasonal alterations) and in the long term (changes throughout time, which are not always necessarily structurally reflected). Short term changes in the use of space occur in the form of daily alterations in relation to the presence or absence of light which allows certain activities to take place and not others, or makes it more desirable for a given activity to take place in a certain space (Tsipopolou 2006, 140). Kamp (1993, 305) pointed out that the availability of shade determined the use of certain spaces within the ground floor in Darnaj (Syria); similarly, the use of roofs increased at night. On the other hand, seasonal use of space is well documented in ethnography (Kramer 1982a, Oliver 2003). Kramer (in Hardin 2004, 75) observed that in South West Asian homes certain inner rooms were used for cooking during the winter, while, during the summer, courtyards and open areas took on this use, most likely while maintaining other simultaneous uses.

Long term changes occur mainly because of the need to suit new circumstances, e.g. demographic or economic changes. Practical reasons, often reflecting sociocultural changes, are behind these transformation processes within the house. Castel (1984) described the evolution of the house of Abd-el Samad in Qurnet Marei through several generations (Figs. 3.50 to 3.52). He identified inheritance as one of the main factors involved in physical changes, given the Islamic custom of splitting the house amongst the offspring of a deceased father (Castel 1984, 135). Some of these changes were due to the need for 'independent' space for each family (Castel 1984, 132), while others were the consequence of disputes between the different parts of the family (Castel 1984, 133). Other social changes, such as acquiring a certain position within the village, also had an effect on the house, e.g. when one of Abd-el Samad's descendents, Nubi, became mayor of the village, he removed the door giving access to his living quarters and moved it to his guesthouse, where he was then residing. The door again changed place when Nubi stopped being mayor (Castel 1984, 133). Lastly, cultural factors such as superstitions and beliefs also had an influence in the position of house features, e.g. a door's emplacement was shifted after it was believed to have been affected by the 'evil eye', consequently causing the death of a child (Castel 1984, 133).

These sociocultural processes can manifest themselves in the modification of access, closure of certain openings, such as doors and windows and the opening of others elsewhere, alterations in room distribution and room use, as well as the structure of the house as a whole. For example, there may be the need to build upper storeys to house new members of the family (Castel 1984, 132, 135).

This can result in physical or non-physical modifications; physical modifications imply that the room walls are destroyed and re-structured, while non-physical modifications might see the room degraded to a function which requires less detail, e.g. sitting rooms and goods storage rooms usually are 'demoted' to food storage rooms, kitchens, hay rooms and animal rooms (Kamp 1993, 309). This 'deterioration' was observed in the modern research sample; in homes where the extended family had disintegrated, those now unnecessary sitting or sleeping rooms were used for storage or animals. Throughout this change of main function in the room, some of the room features might change and other stay the same; however, a usual correlation is the degradation or total loss of the roof (Kamp 1993, 310).

3.3.3. Data analysis

During fieldwork and the collection of floor plans from different sources, five main areas of activity within the mudbrick house were identified: storage, animal keeping, cooking, sleeping and social interaction areas (where entertaining, relaxing and eating amongst others, might take place). To this, an 'others' section was added, to account for those rooms which were associated to uncertain activities. A last sub-section is dedicated to courtyards, due to the archaeological relevance previously mentioned.

Three aspects were studied within each one of the areas: room distribution, access and roofing.

The first aspect to be considered was the room distribution. It is important to note that the attribution of functions to rooms based solely on artefacts can be misleading and must be accompanied by ethnographic information, such as interviews or activity observation. Activities in general can be deduced from groups of artefacts and/or features (Drewett 1999, 166); however, the place where artefacts were found does not necessarily indicate the area where an activity was carried out (Drewett 1999, 166). In addition, most artefacts can be moved between different rooms, implying that there is not always a necessary correlation between the preserved artefact and the main function of the room and that, in any case, this correlation is hardly unequivocal (Kamp 1993, 308). Consequently, attributing activities to specific rooms was based on oral or observation information. However, in the case of the Qurna data set, where this information was not available, it was necessary to use the presence of certain objects for the purpose of assessing the probable main function of each room and allow comparison.

The second aspect was the way in which each room was accessed; the main aim of this part of the analysis was to study the possible association between specific rooms within the house.

Lastly, the type of roof present in each room and the possible correlations between particular types of roofs and specific rooms were analysed in order to help construct hypotheses regarding the recurrence and use of upper storeys, roofs and roof terraces.

3.3.3.1. Nile Delta

3.3.3.1.1. Fieldwork data collected in March 2009

Sample: Five houses (for summary tables per house, see Appendix, document 10, pp. 373-376).

Locations: Kom el-Abiad (KEA01), Kom el Naggar (KEN01, Najrij (NAJ03), Surad (SUR01), Hissat Abbar (HAB01) (Gharbeya govenorate). Information was obtained through a combination of surveys (Fig. 3.36 to 3.41), observation and interviews with house owners (see Appendix, document 9 for interviews).

The two properties in Kom el-Abiad (KEA01) and Kom el Naggar (KEN01) were not the main residence of the owners anymore as new red brick houses had been built next to them, but were still used for storage and animal keeping, and sometimes the owners still slept there.

3.3.3.1.1.1. Storage

Storage did not always require a room and could be accommodated exclusively in the form of containers of various kinds, usually located on a roof terrace. The position of rooms dedicated to storage could be varied: located to the side of a reception room (KEN01, HAB01; Figs. 3.38 and 3.40) or at the rear of the ground floor (NAJ03, Fig. 3.36). The same positions could also appear on the first floor (KEA01, Fig. 3.37).

These rooms were in most cases covered with a sturdy roof of matted reeds over wooden beams. The variety of positions meant a wide range of means of access.

When a room was no longer used for a specific purpose, it could also become a place for storage, which may explain the large number of storage areas in this sample.

3.3.3.1.1.2. Animal areas

The position of the animal areas was common in all examples, namely at the rear of the house (Figs. 3.36 to 3.40, the only exception being HAB01 (Fig. 3.39) where animals were not owned). These rooms were unroofed and could be considered backyards, except for KEN01 where an upper storey located above had collapsed. Sometimes, the whole of the yard was occupied by animals, but most commonly this function was shared with a variety of utilities and the specific area where the animals were kept had low walls and was roofed with branches. In one case, the animal area was roofed sturdily with matted reeds and beams but these were stables (KEA01). Access was usually through the central reception room or through a corridor. Smaller animals could also occupy areas of the roof terrace, as described for storage. Nevertheless, it is important to note that in most cases poultry roamed freely around the house despite having designated areas.

Boundaries between areas for animals and humans were not clearly defined. As expressed throughout the interviews (Appendix, document 9) animals traditionally were an important resource, therefore their protection was essential. As such, the locations of animals at the back of the house might be related to this concept of protection; in one instance, superstition was given as the reason for this rear location, namely the need to protect the poultry from the sight of strangers and hence from the effect of the 'evil eye' (see Appendix Document 9, interview number 5, question 23).

3.3.3.1.1.3. Cooking

In most examples, there was no provision for a room dedicated primarily to cooking. Instead, cooking took place in any room where there was an oven or wherever the portable stove was placed. The oven could be located in the reception or living room area (KEA 01, KEN01, Figs. 3.37 and 3.38), as well as in the backyard (HAB01, Fig 3.40). If the oven was located in the reception or living room areas, the room was roofed with the sturdy roof of beams and matted reeds. In the case of the oven in the backyard, the room was unroofed but the oven itself was covered with a light cladding of reeds and branches. In the first case, access was gained via the main entrance; in the second case, access was gained through a corridor. The oven could be free standing or be embedded on the side of the staircase, as per the types described in 3.2.1.2.6.6.

3.3.3.1.1.4. Sleeping

Rooms mainly dedicated to sleeping could be located to either side of the ground (KEA01, SUR01, HAB01, Figs. 3.37, 3.39, 3.40) and first floor (Figs. 3.37, 3.38). They were usually roofed with a sturdy roof of beams and branches and were commonly accessed from the reception room/entrance hall on the ground floor; however, a corridor could also provide access on either the ground or the first floor. In one case, a sleeping room was also accessible directly from a backyard (SUR01, Fig 3.39).

3.3.3.1.1.5. Social interaction

Social interaction took place in one or several reception rooms, in accordance with Arab and Islamic hospitality traditions to welcome guests. The first room accessed through the main door could act as a reception (NAJ03, KEA01, KEN01; Figs. 3.36, 3.37 and 3.38) or give access to a reception room at either side of this main space (SUR01, Fig 3.39). These rooms had a sturdy roof in all cases, whether made of matted reeds and beams or wooden boards and beams. Access was gained via the main entrance or via the main reception area in the case of secondary reception rooms.

3.3.3.1.1.6. Other rooms

A number of other rooms that were either empty or contained only some tools were in the same position as sleeping rooms in other examples (KEN01, Fig. 3.38). They were also roofed with matted reeds and beams. It was possible that these rooms were previously used for sleeping, given the fact that, as previously explained, some owners did not use these houses as permanent residences anymore.

3.3.3.1.1.7. Courtyards

Two properties had backyards (NAJ03, SUR01; Figs. 3.37 and 3.39), whilst two did not have any type of yard (KEA01, KEN01; Figs. 3.37 and 3.38). One of them also had a red brick enclosure at the front which could be classed as a front yard (SUR01, Fig. 3.39). These backyards were often rebuilt with red brick and were used to wash clothes, store bird cages and keep poultry.

3.3.3.1.2. Survey of houses in Ezbet Machali and Ezbet Mehesin (Eigner, 1984) (Fig. 3.42)

The *ezbah*, as explained in previous chapters, originated with the change in agricultural labour methods caused mainly by the introduction of cash crops and the damming of the Nile since 1861. Consequently, housing was built near cultivation fields which required permanent irrigation. This complex or residential development included the house of the foreman, around which the houses of ten to thirty workers' families were arranged (Lozach 1930, 39; Mahgoub 2000, 6). In many cases these areas later grew into larger settlements as a result of the need to house the continuously growing population (Mahgoub 2000, 6) but the primary reasons for their foundation remained in their names (Kemp 2006, 223), e.g. Ezbet Machali and Ezbet Mehesin.

The archaeological relevance of including *ezbah* in the analysis of modern mudbrick houses is that parallels can be established between them and the ancient workmen's village; the construction of both originally responded to the need to house workers near their place of work. However, at a later date, both modern and ancient settlements expanded to include population not directly involved with the original reason for their foundation (Kemp 2006, 211). Whether by the state's orthogonal planning and perimeters of ancient workmen's villages (Lacovara 1997, 47), or by the foreman of the *ezbet*, in both cases the individual could have been potentially restricted in his choice of spatial distribution and space arrangement, at least when the house was first built.

It is relevant to analyse whether there are any substantial differences between *ezbah* housing and organically-developed settlements, and whether later additions to *ezbah*, or old settlements, developed prior to the change in agricultural methods. This might be an indication of the extent to which the freedom of an individual to design and build as he wishes has a significant influence in a house's final layout. It will also help answer the question whether significant room for individual initiative still exists within planned housing (Meskell 1998, 215).

Sample: 41 in Ezbet Machali and 14 in Ezbet Mehesin

Locations: Ezbet Machali and Ezbet Mehesin (Eigner 1984, 7-28)

The characteristic of the houses in terms of distribution and use of space were virtually identical in both villages, the only exception being that the layout in Ezbet Mehesin was not as schematic (Eigner 1984, 25). Fig. 3.42 bottom right shows the single plan shared by these houses.

3.3.3.1.2.1. Storage

Food storage areas were usually located at the rear, near the animal areas and were mainly used in the winter, while in the summer this storage function took place predominantly on the roof terrace. Sleeping rooms could also be used for storage.

3.3.3.1.2.2. Animal areas

These were usually located at the rear of the house. Access to them could be gained from the main reception area via a corridor. A small number of wealthier houses had a separate door to access the animal area without having to cross the living areas.

3.3.3.1.2.3. Cooking

The cooking area was usually a small room, accessible from the main reception and living area via a door-less opening, which could contain an oven, water containers and a portable stove to be used anywhere in the house.

3.3.3.1.2.4. Sleeping

These rooms were most frequently situated at the front of the house, although in some houses they could also be near the animal rooms. In rare cases, the oven room could also be used for sleeping in the winter.

3.3.3.1.2.5. Social interaction

This took place in a central space, accessible from the main door; this space was also the main area of domestic life, serving as a living room and hall as well as a reception. This room usually gave access to most of the other rooms in the house.

3.3.3.1.2.6. Other rooms: n/a

3.3.3.1.2.7. Courtyards

Only three examples of courtyards were recorded in Ezbet Machali and none in Ezbet Mehesin. In all three cases, these courtyards were placed at the front and were the first place accessed when entering the house via the main door.

3.3.3.2. Upper Egypt

3.3.3.2.1. Mari Girgis

Sample: 4 houses (house of Sawgi Gayyed (SG, Fig. 3.45), house of Adli Masud (AM, Fig. 3.46), house of Hagras, Garas et Girgis (HGG), house of Tawfig and Safig (TS), the last two connected but corresponding to two brothers and their respective families (Figs. 3.43); for summary tables per house, see Appendix, document 10, pp. 377-381).

Location: Mari Girgis (Sohag).

These houses were surveyed by Henein (1988) as part of his full ethnographic study of this village. All rooms were carefully labelled in his drawings, however the publication did not specify whether information about these functions was given by the occupiers or inferred from observation.

3.3.3.2.1.1. Storage

Storage rooms were located on the rear left corner of the ground floor (HGG, TS, AM; Figs. 3.43 and 3.46). In a few houses, this position existed in the first floor

(HGG, TS, SG; Figs. 3.43 and 3.45). Storage in HGG and TS also features several other positions. These rooms were not roofed, or roofed either with a sturdy roof of matted reeds and beams or a light cladding of branches. The most frequent way of accessing these was via the kitchen.

3.3.3.2.1.2. Animal areas

These were located on the ground floor in all cases, at the rear (TS, HGG, AM; Figs. 3.43 and 3.46) or next to the main entrance (HGG, TS; Figs. 3.43), although other positions were also recorded (SG, Fig. 3.45). Where the animal areas were located next to the main entrance they were usually part of a larger room – e.g. reception/living area- and not separate rooms, in which case the access was gained via the main door. The animal rooms were most frequently covered by dry branches. When located at the rear, the access was most commonly gained from a central courtyard or backyard.

3.3.3.2.1.3. Cooking

In half of the house sample, there were no separate rooms exclusively designated for cooking and these facilities were located in the backyard/courtyard (SG and AM; Figs. 3.45 and 3.46); in the other half, there were separate rooms which could be accessed from these backyards/courtyards (HGG and TS, Fig 3.43). These could be roofed with dry branches as a canopy within the courtyard, left in the open or fully roofed.

3.3.3.2.1.4. Sleeping

Sleeping rooms could be located in different positions, normally on the first floor (HGG, TS and SG, Fig. 3.43 and 3.45), but this could vary between seasons and to suit particular needs (Henein 1988, 13). However, sleeping could also happen in areas –not separate rooms – close to the main entrance on the ground floor (Figs. HGG, TS and SG 3.43 and 3.45), associated to the protection of the animals there (Henein 1988, 14). Access was gained via the staircase in the case of the first floor rooms and via the main entrance in the case of unenclosed areas.

3.3.3.2.1.5. Social interaction

Only one house had an area at the entrance which could serve the function of a reception room (AM, Fig 3.46); this was deduced from the presence of a wooden bench. The possibility of that bench being used to watch animals during the night as seen in other examples was ruled out given the absence of animals. However, all other examples had a wooden bench and animals near the entrance, so there is a possibility that this space was used both for sleeping and as a reception. This was located immediately after entering the house, so access was via the main door. This area was roofed with the sturdy roof of beams and matted reeds. No other rooms accessible from that area served as reception rooms.

3.3.3.2.1.6. Others

Many houses in this village also had pigeonhouses forming part of their roof structures (Fig 3.44).

3.3.3.2.1.7. Courtyards

In three cases, there was a central courtyard which had a mud stove (*kanun*) and a large water jar (*zir*) (HGG, TS, AM; Figs. 3.43 and 3.46). This was also the place for a staircase leading to the roof terrace (except in AM as this was a the single-storey house). In another case (SG, Fig. 3.45) this staircase was in a backyard and was therefore accessed via a corridor, rather than from the main entrance as in the other cases.

3.3.3.2.2. Qurna (Hassan Fathy's personal archive, RBSCL, AUC)

Sample: 7 houses (e4 7, e4 15, e4 16, e4 20-21, e4 23, e4 1, e4 2; Figs. 3.47 to 3.49; for summary tables per house, see Appendix, document 10, pp. 382-389).

Location: Old Qurna

This data set was collected prior to the first demolition of Qurnawi houses in the 1940s. A survey was carried out of a number of houses and notes were taken of the contents of each one of the rooms. The survey appears to have been carried out very quickly –possibly by a student of Hassan Fathy's- without any intention of it being published[3]. This is suggested by the fact that the plans do not have a scale, and the rooms in the first floors are rarely numbered; consequently, in some cases, despite knowing the contents of the rooms, it is not possible to know what room they correspond to on the plan.

The lack of absolute dimensions is not an insurmountable problem given that relative dimensions are enough to establish the relations between different rooms, but the fact that the rooms to which some descriptions correspond cannot be identified with certainty, meant that this originally larger sample could not be used in total.

The function of each room was therefore not given by the surveyor apart from certain exceptions, so the main function has been established on the basis of the presence of certain objects, for the purpose of comparison. Although this might result in errors of judgment, it shows a more accurate picture of the blurred boundaries between room functions and the difficulties of using objects to isolate those functions.

This is particularly the case for sleeping and social interaction areas: if the fact that reception areas are traditionally located near the main entrance is ignored, then it is difficult to distinguish the two. It is possible that beds, as opposed to just benches, commonly indicate rooms dedicated mainly to sleep; however, this function might not be exclusive. Similarly, wooden benches (*dekka*) can indicate reception or socialising areas, but they can also be used for sleeping, particularly during the day. In this case, other furniture such as wardrobes might indicate a more private function, while cushions, mats, the presence of a small wooden table used to serve tea, glasses or crockery might suggest a public use.

Storage was inferred from the presence of wooden boxes, agricultural tools, wooden shelves or a large amount of piled dry branches.

Cooking areas were determined by the presence of an oven or of a gas stove, as an indicator of cooking activity at least during certain times of the year.

Where these elements were not present, or in cases where there was no sufficient evidence to classify the room's main function, that room was classed as 'others'.

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[3] Conchita Añorve Tschirgi (RBSCL, AUC) personal communication.

3.3.3.2.2.1. Storage

Storage rooms could be located in various positions within both the ground and the first floor, although the former was more common. In either case there was no predominant position within the floor plan (see Figs. 3.47 to 3.49). The rooms could be unroofed, partially covered by reeds and branches or roofed with palm fronds and branches or wooden boards and branches. Due to the various positions, access was gained through various means: from corridors, directly from the main entrance, from a sleeping room or from an animal room and from the yard.

3.3.3.2.2.2. Animal areas

These could be found in a variety of positions within the ground floor, although the back position seen in other areas does also feature (e4 7, Fig 3.47). Most of them were unroofed, although they could also be partially covered with dry reeds and branches, wooden boards and branches or partially covered with wooden boards. Access was usually gained via the courtyard or from the reception room.

3.3.3.2.2.3. Cooking

In certain instances, no cooking facilities were available, while in others there were portable cooking facilities and/or an oven. Ovens were usually located in the courtyard or in a room which was only partially roofed with dry reeds and branches. In these cases, access was gained mainly via a corridor.

Portable stoves were located in rooms that appeared to have other main functions: a storeroom near the main entrance (e4 1, Fig 3.49), a possible secondary reception room accessible from the entrance room (e4 23, Fig 3.49), and rooms at the rear of the ground floor (e4 7, e4 15, e4 6; Figs. 3.47 and 3.48). They could be roofed with wooden boards or wooden boards and branches.

3.3.3.2.2.4. Sleeping

Determining the difference between bedrooms and reception rooms can often be difficult. Four related elements might have served both uses: iron beds, branch beds, wooden benches and mats. Although not exclusively, it would appear more likely that the first two would have had a more private function while the last two would have been found in social interaction areas, i.e. reception rooms. However, it would seem that any of these elements could be present in rooms adjacent or accessible directly from the main reception room or main entrance area (e4 1, e4 2, Fig. 3.49), while beds were more common on the first floor where available (e4 15, e4 16, Figs. 3.47 and 3.48). There were also a couple of examples of rooms with beds at the rear of the ground floor. These rooms could be roofed with wooden boards, wooden boards and branches or palm tree leaves and branches. Access was gained from the main reception/entrance room and via corridors.

3.3.3.2.2.5. Social interaction

The reception room could be located on the side of an entrance hall or corridor (e4 1, e4 2, Fig. 3.49), although in some instances it was unclear whether such room was a bedroom, or could be used for either purpose as mentioned. In some other cases, this room did not exist and it is possible that the entrance hall was used as a reception (in e4 15, e4 20-21, e4 23, Figs. 3.47, 3.48 and 3.49). This room could be roofed with palm tree and branches or wooden boards.

3.3.3.2.2.6. Others

A number of other rooms had a variety of objects which could indicate different or multiple uses, such as buckets, scales, tables, clothes, mats, lamps, tools, etc. Some of them were empty (e4 16, Fig 3.48). A recurrent room contained a staircase to access the upper storey, usually located near the entrance hall and which could have mud containers or water jars in it. This room was in most cases half unroofed, half roofed with dry reeds and branches.

3.3.3.2.2.7. Courtyards

Not all examples had courtyards and some examples had more than one unroofed space which could be considered as a yard. These yards were found in a variety of positions: at the front (e4 1, Fig 3.49), in the rear section of the house (right corner and centre) (e4 15, e4 16, e4 23; Figs. 3.47, 3.48 and 3.49) and across the central section of the floor plan. They were unroofed or partially covered with dry reeds and branches, and several contained ovens.

3.3.3.3. Dakhleh Oasis

(Figs. 3.53 to 3.55; for summary tables per house, see Appendix, document 10, pp. 390-392).

Sample: 3 houses (BAS01, BAS02, BAL01)

Location: Bashendi, Balat (Schijns, 2008)

The amount of survey work carried out in the Dakhleh Oasis is limited. In 1959, the New Valley Project was started by the government, one of the consequences being the creation of new towns (de Filippi 2006, 5). As a result, many of the old settlements and the houses in them were abandoned. Given the progressive deterioration of the old towns' medieval fabric, the Supreme Council of Antiquities (SCA) introduced a ban on altering the structures or doing any form of maintenance that might have altered houses in Al Qasr and Balat (de Filippi 2006, 6). This means that the degree of variability within the villages of the Oasis is smaller, probably also due to the historic isolation of the area. Herbert Winlock's photos from 1908 prove that the appearance of the houses in these villages has remained virtually unchanged for a century (Schijns 2008, 17).

3.3.3.3.1. Storage

The storage rooms were located at either the rear right or left corner (BAS01, BAS02, BAL01; Figs. 3.53 to 3.55) or the front right corner of the ground floor (BAL01, Fig. 3.55). In all instances these were roofed with beams and the access was gained from the reception room or a corridor/ hall. In addition, there was one example of an underground storage space dug into the hall of one of the houses.

3.3.3.3.2. Animal areas

None of the houses had rooms for large animals; one had a small enclosure for chickens next to the yard (BAS01, Fig. 3.53) and another one on the roof terrace (BAL01, Fig 3.55).

3.3.3.3.3. Cooking

There was no provision for cooking in one of the properties (BAS02, Fig. 3.54). In the other two, a kitchen was located in the rear left corner of the ground floor

(BAS01 and BAL01, Figs. 3.53 and 3.55), one of them totally unroofed and another one partially lightly roofed. In addition, one of them had a summer kitchen located on the first floor (BAL01, Fig. 3.55). The access to the winter kitchens was gained via a hall and the summer kitchen via the roof terrace.

3.3.3.3.4. Sleeping

All bedrooms were located at the rear of the ground floor (BAS01, BAS02, BAL01, Figs. 3.53 to 3.55); only in one case was a sleeping room located at the rear of the first floor (BAS01, Fig 3.53). A number of them also acted as storage rooms. All had wooden beams and matted reed roofs.

3.3.3.3.5. Social interaction

The reception room was the first room accessed when entering the house via the main door (Fig 3.53). On two occasions, one of the houses also had a reception room on the first floor (Fig 3.53, 3.55), directly above the ground floor reception area. They were roofed with wooden beams and matted reeds.

3.3.3.3.6. Others

Notable in these houses was the presence of bathrooms (BAL01, Fig. 3.55) and a dry toilet (BAS01, Fig 3.53). These could be accessed from the bedroom or women's reception and from the roof terrace.

3.3.3.3.7. Courtyards

In one case there was no courtyard (BAL01, Fig. 3.55); in another, only a yard located on the left hand side (BAS01, Fig. 3.53). In a third case, where a house used to belong to an ezbet, there was no internal courtyard, but a courtyard shared by different houses (BAS02, Fig. 3.54).

3.3.3.4. Comparative outline of mudbrick house activity areas

Given all the information above, the aim of this section is to summarise the common characteristics of each area and to offer possible explanations for any differences (for summaries of each area, see Appendix document 10, pp. 393-396).

3.3.3.4.1. Storage

In the three areas studied - Lower Egypt, Upper Egypt and the Dakhleh Oasis – the provision of rooms solely dedicated to storage coexisted with the presence of mud storage containers which could be located in various areas of the house, although they were most commonly placed on the roof terrace of two-storey houses. A repetitive pattern in the position of storage rooms, either within each area or between different areas was not apparent (the exception being the Mari Girgis sample were all storage rooms were almost unanimously located on the rear left corner of the ground floor); however, the vast majority of storage rooms across the three areas were located on the ground floor rather than the first floor. In addition, the presence of first floor storage rooms, for instance in Upper Egypt, appeared to complement the ground floor storage provision as opposed to being a substitute for it; in such cases, the nature of what was being stored did not appear to have a definite influence in the upper or ground floor location.

The most common roofing of storage rooms in Lower Egypt and in the Dakhleh Oasis was a sturdy roof of wooden beams and matted reeds, although a light cladding of dry branches and reeds also occurred. In Upper Egypt, this light cladding which roofed the room only partially, existed alongside a sturdy roof which could be either wooden beams and matted reeds or wooden boards and branches. Some storage rooms were not roofed. In the case of Lower Egypt, it is possible that the re-use of old sleeping rooms for the purpose of storage, as well as the secondary function that sleeping rooms already had as storage areas (also witnessed in the Dakhleh Oasis and uncommonly in Upper Egypt) might account for the predominance of sturdy roofs over other types. Because of the variety of storage room positions, no association with any particular room providing access to them was identified.

The distribution of storage would seem to be directly related to the assets available. If only food and drink storage is necessary for family consumption, mud containers can fulfil this requirement; however, if the family has a surplus of grain or if they possess a large amount of objects, such as agricultural tools, then rooms may be needed. Therefore, it could be assumed that there is a likely correlation between the presence of storage rooms and a larger economic capability. However, this interpretation does not take into account the flexibility in the use of space, highly influenced by seasonality. A consequence of this flexibility is that certain storage spaces might acquire a particular relevance during certain seasons. For example, in Ezbet Machali and Ezbet Mehesin, areas at the rear of the house and close to the animals were mainly used for storage during the winter, while this role was assumed by the roof terrace in the summer (Eigner 1984, 12), an instance being animal fodder removed from the roof and moved inside to prevent it from rotting in the rain (Eigner 1984, 12). This means that while some rooms served as storerooms for animal fodder during the winter, these same rooms might have been empty or served a different purpose during the summer.

Lastly, the use of sleeping areas as storage might be related to the protection of valuable assets.

3.3.3.4.2. Animal areas

In both Lower and Upper Egypt, animal rooms were located at the rear of the ground floor. An exception to this location was seen in Mari Girgis, in Upper Egypt, where animals could also be found in areas near the entrance, but in these cases they were not dedicated rooms. In addition, large animal rooms did not feature in Dakhleh. There appeared to be a distinction between large animals, such as cows, and small animals, like poultry. The first group always featured on the ground floor while the second group did not require a room and could be placed on the ground and/or the first floor.

The main reason for the choice of floor concerning large animals appears to be clearly physical, given the obvious difficulties of bringing the animals up to or down from the first floor, as well as the inconvenience of their weight and movement. On the other hand, poultry could appear near these areas or on the first floor, in chicken coops and small pens, and could also be found roaming around the house.

Both locations attributed to large animals can have a protection purpose, whether from a real or an imaginary threat: theft or superstition, the fear of the effects of the evil eye. In addition, the location of animals at the rear can also sometimes be justified in the wealthier properties in Lower Egypt, by the convenience of taking these animals into the fields without passing through the living quarters; for this purpose, a special door at the rear was provided.

Because of the general position of large animals in rooms at the rear, the means of access depended on the size of the house: this means that they could be accessed directly from a reception room, via a corridor or from the backyard in the largest examples.

Animal rooms were not covered if they were located in yards, or were located under areas with dry branches which were used as animal fodder, therefore doubling up as storage areas. The only cases of sturdy roofs of wooden boards, sometimes with branches, were found in Qurna, aside from an exception in the case of stables in Lower Egypt. As noted before, however, it is difficult to ascertain the functions of these rooms and the possibility that these animals were roaming and were found in other areas at the time of surveying cannot be ruled out.

3.3.3.4.3. Cooking

There are two objects related to cooking, the oven and the portable stove. The idea of a room devoted exclusively to the kitchen is not common, and appeared only in one case in Dakhleh, where a house had both a winter and a summer kitchen (Fig. 3.57). In both Lower and Upper Egypt the oven was usually located either in the courtyard/backyard or a room accessible from it. In addition, in Lower Egypt, the oven could also be located in the reception room, or, in the case of Ezbet Machali and Ezbet Mehesin, in a small, door-less room off the reception room. Access was therefore gained via a corridor or from the reception room in the case of both Lower and Upper Egypt and from the main entrance or from the reception room in the case of Lower Egypt.

Location determined the roofing of the cooking areas. In both Lower and Upper Egypt, an oven located in the courtyard, was in the open or partially shaded by a light cladding of branches. In Lower Egypt, where the oven could also be located in the reception, the roof was sturdy. This poses the problem of how the smoke was extracted. In Ezbet Machali and Ezbet Mehesin, Eigner recorded the provision of an opening in the roof, however in the Delta sample no chimneys or extraction openings were recorded and roofs were obviously physically damaged by the accumulation of ash and smoke.

Portable stoves were found in a variety of rooms in all three areas.

The larger amount of ovens in open areas can be associated with the practicalities of allowing the smoke to leave the house; in the cases where the oven was in the reception room or in the off-room and therefore covered, the oven could also be seen to perform a physiological and social function, providing warmth in the winter or at night and acquiring a similar function to a hearth, reason for which the room could sometimes be used to sleep (Eigner 1984, 11).

Cooking appears to be again affected by seasonal factors, while the oven is used during the summer, the portable stoves can be used inside the house during the winter.

3.3.3.4.4. Sleeping

In Lower Egypt, sleeping rooms were located at either side of the central reception room or a corridor on the ground floor or at either side of a corridor area on the first floor. However, in Ezbet Machali and Ezbet Mehesin sleeping rooms were located near the animals as well as at the front of the house. The reason for a location near the animals could be keeping warm in the winter. In rare cases, the oven room was also used for sleeping in the winter as mentioned. All the sleeping rooms across the three areas have sturdy roofs, which might explain why these rooms double-up as storage, offering extra protection from rain and wind. In Dakhleh, all sleeping rooms were located at the rear of the ground floor.

The access was gained from the entrance hall/reception room or from a corridor.

Sleeping areas are also affected by seasonality. In the summer, the roof terrace could be used for sleeping. In certain instances, e.g. in Ezbet Machali and Ezbet Mehesin, summer beds were placed on the roof terrace. However, no examples were found during fieldwork in the Delta, where the roofs have now collapsed and are in disrepair, and it is difficult to be certain whether sleeping would have occurred on the roof terrace, although there is enough evidence for the presence of sleeping rooms in the upper storeys, despite their further collapse. The use of the roof terrace for sleeping in Upper Egypt and Dakhleh is not specifically mentioned in the sources used.

3.3.3.4.5. Social interaction

Reception rooms were most commonly accessible from an entrance corridor or hall, although this hall could also act as a reception room in some cases. In a small number of examples, there was no entrance hall or corridor and the reception room was the first room to be accessed from the main door. Both reception rooms and entrance halls/corridors had sturdy roofs in all cases, either with wooden beams and reeds or wooden boards. In the case of the Mari Girgis houses though, there was only one house that featured what could be identified as a reception room; in fact, Henein (1998, 12-18) does not mention the reception room in his description of the typical rooms of a house in Mari Girgis. The reason for this is perhaps that the entrance area was used for both sleeping and social functions, or that social functions were limited to external structures, such as the *zwayeh* or *mandara.*

3.3.3.4.6. Others

In both Lower and Upper Egypt there were a number of empty rooms or rooms holding only some tools, which did not appear to be performing any function at the time of surveying. This could be due to the houses not being fully used anymore or to the seasonal variation in use as explained before. These rooms always had sturdy roofs, which suggests that they could have been former bedrooms.

A peculiarity surveyed in Dakhleh was the presence of a dry toilet and areas designated as bathrooms.

3.3.3.4.7. Courtyards

The courtyard appears not to be as ubiquitous as it might have seemed from the literature (Arnold 1989, 90). While the vast majority of Upper Egyptian mudbrick houses appear to have a courtyard, many Lower Egyptian houses do not have one. It has been suggested that when courtyards are absent, this is due to space restrictions (Henein 1988, 6); however, there is no evidence to rule out preference or convenience as the reasons for its absence.

While courtyards appear to feature more often in Upper Egyptian houses, they are by no means always in a central position; in fact, in this research sample, there are more courtyards located on either side of the floor plan or at the rear than there are central courtyards. Examples of houses with several courtyards have also been recorded. In Dakhleh, courtyards do not appear to be a popular internal feature of houses, but rather a means of separating house clusters within the fabric of the towns.

The most important role of the courtyard in the mudbrick houses of both Lower and Upper Egypt appears to be that of providing a space for carrying out some domestic chores, most notably cooking and washing. The courtyard also serves to keep animals such as poultry and various objects, and to store food, normally in mud containers. This role can however be performed just as well if the courtyard is on a side or the back of the house. In addition, although the convenience of cooking in an open area for the extraction of smoke is evident, internal features in roofed areas can provide alternative solutions to this problem, such as the roof openings recorded by Eigner in Ezbet Machali (Eigner 1984, 10). The role that the courtyard plays in providing ventilation and light, can be achieved through alternative means, such as clerestory windows, e.g. those in Ezbet Machali houses (Eigner 1984, 20).

In Upper Egypt, the courtyard is commonly the place where the staircase leading to the roof or, most frequently, to the upper storey, is located; however this courtyard does not necessarily have a central location. It should be noted that the role of the courtyard as a key element of the house, providing access to all rooms, only applies to cases in which the court is central.

Therefore, while there are some obvious social and structural benefits to the central courtyard, these requirements can be fulfilled by other means as is shown by numerous examples of both houses with back and side yards and houses without any type of courtyards.

The implications of these findings for the interpretation of ancient Egyptian houses will be detailed in chapter 4.

3.3.3.4.8. Use of space beyond ground floors

The analysis of the use of space in upper storeys might provide some clues about an aspect which is difficult to reconstruct from the archaeological record.

First floors did not occupy the whole of the ground floor area in many cases across sample areas; a roof terrace being formed instead. This terrace was used for storage, utilities such as drying clothes and roaming poultry. First floor rooms were used for sleeping or storage across all sample areas; in addition, some sleeping rooms had also been 'demoted' to storage rooms. In Dakhleh, the use of space in the first floor mirrored that of the ground floor, both having sleeping, social interaction and cooking areas.

3.3.4. Conclusion

First and foremost, it must be born in mind that the number of floor plan arrangements in mudbrick houses is extremely large, due to the flexible properties of the material. This high degree of flexibility means that floor plans can often show as much variability within the same area as they do between different areas. Certainly, there appear to be certain common characteristics within areas, notably the lower frequency of courtyards in Lower Egypt in comparison to Upper Egypt. However, it is not viable to speak of 'typical' Egyptian rural houses based on this sample, given the degree of variability in it. This is symptomatic of the difficulty in talking about 'typical' layouts of mudbrick houses across different areas of Egypt. An exception to this variation would be the houses in Ezbet Machali and Ezbet Mehesin –particularly the first- which seem to show a much lesser degree of variety both in size and room position (see Eigner 1984, Fig. 3.42). This is most likely due to these settlements having been planned and not developed organically. It would appear that this planning resulted in a small degree of variety in the villages as a whole, independently of the further individual, work-unrelated additions to the village.

The physical distribution of space, together with its actual use, is affected by the economic and sociocultural factors mentioned in the 'Contextual background' section as influencing the evolution of the mudbrick house in Egypt (e.g. amount of land, status, economic capability, family structures). These factors affect the individual distribution of space, number of rooms and location of each house.

Based on the activity areas detected, it could be said that, within each house, each activity takes place primarily in a certain room, which is not necessarily the same room or in the same position from one house to another; in addition, there are a series of secondary areas where that activity is also performed under certain circumstances. When the activity in question is performed in a secondary area, it might or might not leave a trace depending on how sustained its practice was in that particular spot.

At the same time, rooms can be given a different use from their original function; certain rooms that were built with a predominant function in mind, e.g. bedrooms, can be used for storage in addition to sleeping. In addition, the function of a room might change depending on the time of the day or of the year, e.g. sleeping might take place in a bedroom at the front of the house in the summer, but this function might be performed by an animal room in the winter in order for the owners to keep warm, as described in Ezbet Machali and Mehesin.

As explained, the courtyard does not always feature. There is, nonetheless, a common area present in the vast majority of houses in Lower and Upper Egypt and the Dakhleh Oasis: the entrance hall accessible from the main entrance. In some instances, this hall, in addition to its living room functions also performs as a reception room (see Eigner 1984, 10); in others, it provides access to a reception room on the side. In many cases, it usually provides access to other rooms, including bedrooms and backyards. This entrance area is consistently roofed sturdily with wooden beams and matted reeds. This corresponds with Kamp's (1993, 300) affirmation that public activities need specific physical settings, and that this prompts certain standardisation.

It would therefore appear that it is the entrance area that takes the structuring role previously attributed to the courtyard, although occasionally the courtyard can also perform this function. The latter appears to be more widespread in Upper Egypt, while the entrance hall appears to be more prominent in Lower Egypt where the number of courtyards is lower.

In summary, the study of distribution and use of space in this research sample has shown that, although there is a recurrence of certain activities and some patterns in the position of the rooms in which those activities take place, they did not result in identical house plans.

3.4. General conclusion

Chapter 3 has presented a study of modern mudbrick houses, with the aim of providing tools for an ethnoarchaeological study of ancient Egyptian houses. It has described important changes occurring during the end of the 19th century and throughout the 20th century in the economy, society and culture of the country and explained their reflection on rural domestic architecture. It has then analysed the materials, features and the distribution and use of space in a number of locations in Lower Egypt, Upper Egypt and Dakhleh Oasis.

The study of modern mudbrick houses in various areas has allowed for the identification of a series of factors which can have an influence on the appearance, characteristics and distribution and use of space; these considerations are relevant for the analysis of archaeological remains. These factors and the changes they may be subject to are responsible for the similarities and differences between houses.

Environmental conditions, such as the climate and water resources, affect the presence of extended or dense houses, including the availability of more than one storey. They also influence particular characteristics of the material and the structural features. Similarly, land tenure or ownership may affect the presence of extended or dense houses and the presence of multiple storeys. Subsistence means, for example, agriculture, affect the distribution of the house.

Proximity to urban centres and degree of communication with larger centres can influence the materials and result in certain architectural features.

Local industries and the presence of distinct ethnic groups can also have an effect on the presence, material and decoration of specific features.

Family structure influences the internal distribution of the house as well as the number of storeys. Similarly, the internal distribution of the house is affected by gender and public/private conventions. The need to show status and social differentiation requires the use of certain materials and the presence of particular features.

In summary, chapter 3 has identified a series of factors which have an influence on the physical characteristics of the house, and the specific ways in which they may affect the choice of material, the structure, and the distribution or use of space. It has also provided the theoretical principles, methodology and data necessary for the study of ancient mudbrick houses in Egypt which will be the object of chapter 4.

Chapter 4: Analysis of ancient mudbrick houses

4.0. Introduction

In Chapter 3, the contextual and material factors which were likely to have had an influence upon the physical characteristics and internal distribution of Egyptian modern mudbrick houses were analysed and interpreted. Through that analysis, a series of categories were developed in order to provide an orderly and comprehensive description of such factors.

Firstly, the contextual levels theoretically formulated in chapter 2 were specifically defined; this was achieved through an analysis of the most important processes which occurred in Egypt from the end of the 19th century across the 20th century and their effects on the characteristics and development of mudbrick houses. From that analysis derived a division of contextual levels into environmental, sociocultural, community-related and individual factors, which will be applied to the analysis of the archaeological contextual factors in the present chapter.

Secondly, a description of materials and architectural features was undertaken for which a standard modern architecture division was used, thus resulting in the categories shown in Fig. 3.2. (external finishes: roofs, walls, doors, windows, features; internal finishes: ceilings, walls, doors, windows, others). These categories will be applied to the description of ancient architectural features in order to provide an orderly and standardised description method which is often lacking in archaeological reports.

Thirdly, the analysis of the distribution and use of space in modern houses resulted in the identification of a series of processes which operate in the house and affect its distribution (for example, recycling and maintenance), as well as the distinction of five predominant activities recurrent in mudbrick houses: storage, animal keeping, cooking, sleeping and social interaction. To this, an analysis of activities undertaken in courtyards was added since, as explained in chapter 2, courtyards have taken a fundamental role in previous interpretations of ancient Egyptian mudbrick houses. The identification of generic processes and of predominant activity areas – with a separate mention of courtyards — will also guide the archaeological material presented in this chapter.

Chapter 4 will thus present the archaeological material based on the categories developed through the study of the context, material and distribution and use of space in modern mudbrick houses; the analysis and interpretation of this material will then be founded upon the theoretical understanding of the types of relationships established between context and material, achieved through the study of the modern houses. The aim is to test whether the archaeological record can be better understood by applying this understanding on the actual material, with particular attention to courtyards and upper storeys which are problematic elements in the archaeological record.

The 'Introduction' will make some remarks regarding the data sample, as well as explaining the rationale behind the selection of sites and specific houses within them.

The 'Contextual background' section will describe the environmental conditions which have affected the Delta and Nile valley as a whole through History. It will then analyse the contextual levels described in the data sample, following ancient Egypt's traditional period division, thus distinguishing between Old Kingdom (2575-2465 BC), Middle Kingdom (c. 2055-1650 BC), Second Intermediate Period (c. 1650-1550 BC), New Kingdom (c. 1550-1069 BC) and Third Intermediate Period sites (c. 1069-664 BC). The reasons why the remaining Dynastic periods were excluded from the sample were outlined in section 2.3.2.4.1.

The 'Materials and features' section will present a comparative summary of the materials and architectural features across the archaeological sample, according to the classification previously developed for the description of the modern material; it will then provide an interpretation based on the main types of links between context and material and architectural features identified in the study of the modern material. This aims to pinpoint the possible reasons behind the presence of absence of certain features in the archaeological record and behind the specific differences in the preserved features.

The 'Distribution and use of space' section will analyse the distribution of space with regards to the different contextual levels previously identified. It will aim to identify the activity areas described in the analysis of the modern houses and analyse their correlation with the physical distribution of the house. This analysis will make use of the key concepts identified during the analysis of the modern mudbrick houses and previous ethnographic studies. The aim is to test a method of distribution and space analysis based on an identification of activity areas rather than room functions in order to explore the processes and changes in the use of space.

Finally, the 'Conclusion' will reflect upon what has been learnt about the archaeological data, through the application of the methodology and theoretical concepts developed during the study of the modern mudbrick houses. The aim will be to assess the ways in which the application of ethnoarchaeology can help understand ancient mudbrick houses better and to translate those into specific interpretative tools.

In this manner, Chapter 4 will fulfil sub-aim/objective 4 and complete the ethnoarchaeological application of the analysis of the data from Egyptian mudbrick houses, the main objective of the research. This will materialise into the development of new interpretative tools for the study of ancient Egyptian domestic architecture in Chapter 5 (sub-aim/objective 5), through which the main aims of the research will be achieved.

4.0.1. Limitations of available data

The reasons for the relatively limited amount of data available regarding mudbrick houses in ancient Egypt were already outlined in section 1.1. As previously mentioned, the natural conditions, the organic nature of the material and the archaeologists' priorities all have had an influence in the information available. Thanks to the rise in interest in settlement archaeology, including that of Egypt, particularly since the 1970s (Ucko *et al* 1972; Bietak 1979; Hassan 1993, O'Connor 1993, Bietak *et al* 2010), as well as the beginning of systematic excavations for example at Amarna (Kemp 1984, 1985, 1986, 1987, 1989a, 1995a), the recording of architectural features has largely improved; however, there is a lack of a standardised methodology or conventions relating to the description, analysis and interpretation of those features. This is particularly obvious in the terminology employed, as a variety of terms are used to describe identical architectural features, for example, pivot socket (Lehner *et al* 2009), pivot hole (Petrie 1890, Kemp and Stevens 2010) and pivot/hinge depression (Spencer 1993). The problem is aggravated by the variety of languages used to publish archaeological reports and the successive translations of these works. This lack of standardisation often hinders a comparison between data sets.

Beyond material description, when the description of house remains forms part of an excavation memoir, an insight into contextual factors related to the site in question is usually offered, for example a description of the topography of the site. In fewer cases, thorough studies of the environmental conditions and the geomorphology of the site, especially in relation to hydrography, have been undertaken.

This variability in archaeological publications, both between early reports and modern ones and between different examples of the latter, accounts for the different amount of detail in the context and material descriptions below.

4.0.2. Rationale behind the selection of sites and houses

Since context, in a global sense, is one of the three fundamental pillars upon which the research is founded, a set of data with the necessary geographical and chronological range was selected in order to test the various contextual levels established in Chapter 2 (see Fig. 2.10 for a map of selected sites). Accordingly, the primary selection of particular sites within the same period was based, where possible, on them having different environmental conditions. Nevertheless, the inclusion of Delta sites was affected by the limitations regarding data availability and quality. Secondly, a conscious effort was made to include sites which were likely to represent variety within the remaining contextual levels, namely sociocultural, community and individual circumstances. For that reason, whenever possible, sites were chosen which had been previously interpreted as the habitations of different classes, which were the result of state planning, and which provided enough data to give information about community and rarely individual peculiarities.

The sites and houses selected are presented in Fig. 2.9. In the case of the Old Kingdom, very few domestic structures have been preserved; most published examples, such as those excavated for example in Kom el-Hisn or Abusir (on Neferirkare's pyramid causeway) provide plans, however a detailed description of the architectural features was not undertaken by the excavators; therefore, the necessary amount of information to be included in a comparative study of features was not available. In contrast, scientific excavations have been carried out at the site of Giza by a multidisciplinary team since 1988 (Giza Plateau Mapping Project, Ancient Egypt Research Associates) with excellent recording of information.

The Middle Kingdom provides abundant evidence for housing, thus it was possible to base the rationale behind the site selection on several of the contextual factors; primarily, there is an environmental distinction between sites located in the Nile Valley (Kahun, Lisht, Elephantine) and sites located in the Delta (Tell el-Daba) as well as the presence of man-made alterations to the environment (such as those that will be described in the Fayum Oasis, where Kahun was located), sociocultural circumstances and community circumstances (for example, the originally state-planned settlement in Kahun and Tell el-Daba as opposed to the 'organic' development of Lisht and Elephantine).

The sites with domestic remains belonging to the Second Intermediate Period are few, and the selected sites were Tell el-Daba and Deir el-Ballas. The availability of data for Tell el-Daba has the advantage of providing information for the same site in two different periods, which correspond to two different political stages (the first one, not long after the site's foundation where the site appears to be of no particular significance and the second, where it became a capital city) as well as being the result of two different urban developments, planned and organic respectively. Deir el-Ballas houses belong to the end of this period and represent the transition towards a new period from a political point of view –due to the reunification of the country-, although a continuation of forms and traditions at the beginning of the period seems apparent (Bryan 2000, 207).

The two sites selected for the New Kingdom are Memphis and Amarna. Amarna is the site that has provided the most information regarding ancient Egyptian domestic architecture as explained in chapter 1, therefore it is essential to examine these data, although the amount of houses excavated there makes it impossible to analyse all areas of the site as part of this research. On the other hand, Memphis was a city of continuous importance throughout ancient times, due to it being a religious, political and commercial centre, and it was included for this reason.

For the Third Intermediate Period, the amount of sites is also limited. Karnak was selected because of its being a priestly development, a type of town with a long tradition since the Old Kingdom as seen in Giza. El-Ashmunein was included by virtue of its different location, being a nome capital and its inner city status, despite the amount of data for this site being fairly limited.

With regards to the selection of specific houses (Fig. 2.9), this responded to specific issues in relation to previous interpretations of house plans, the details of which were explained in the ‘previous interpretations’ section of Chapter 2. They included: planned houses (Giza, Tell el-Daba in the Middle Kingdom, Karnak) and organically-developed houses that have received a particular categorization in previous studies, e.g. ‘tripartite’ (Elephantine’s H25a, H12; Amarna’s N50.19 and O49.14), ‘tripartite with staircase’ (Amarna’s N49.6), ‘evolved tripartite house’ (Amarna’s O47.8), ‘negative and positive intermediate solutions’ (Amarna’s N51.4 and P47.6 respectively), the ‘standard Amarna villa’ (Q46.2), ‘large solutions’ (N49.18/58) and ‘courtyard’ houses (Elephantine’s H10, H86 and H25b). In cases where several types of houses were preserved at the same site, there was an intentional selection which included examples of all size/types (Kahun, Amarna). In other cases, the selected houses were those within the site which were best preserved or best studied (Lisht, Deir el-Ballas, Tell el-Daba Second Intermediate Period, Memphis).

4.0.3. Sources used in the study

The Giza houses were first excavated and published by Selim Hassan (1943). The observations of Hassan refer generically to houses A to F indistinctly; consequently, where the tables give a unique feature description for all houses, it refers to this source.

Hassan’s biggest contribution was the mapping of the entire town (Tavares 2008, 8); however, his recording of individual houses was compromised by the fact that he did not take into account different building phases. It is thus not possible to infer from his records how long the settlement was occupied for (Tavares 2008, 8) and his generalizations must be taken with caution.

Observations referring to houses E and K are from the excavation of the AERA team (Giza Plateau Mapping Project Season 2005 and seasons 2006-2007 Preliminary Reports (Lehner *et al* 2006 and 2009), and Aeragram magazine 9/2 (Tavares, 2008)). The strength of the information provided by this project resides on their use of the latest technology as well as the interdisciplinarity of their team, which includes dedicated surveyors, GIS experts, archaeobotanists and archaeozoologists, amongst others (AERA 2011).

Given the similarities between the Kahun large mansions and the smaller houses amongst themselves, Petrie (1890, 1891) did not give specific numbering to different houses and did not describe houses individually (aside of the house in the acropolis). Instead, he distinguished several town areas and described the general materials and characteristics of each one of them. Similarly to Hassan, his big achievement is the mapping of the town and the distinction of areas within. Although he listed the objects he found, he did not indicate the location and context of most of them (Gallorini 1998, 42). Additional information corresponds to David (1996), who clarified some details of Petrie's account, thus still relying on it. This information is complemented by Quirke (2005), who attempted an identification of house prototypes across the settlement, identifying various house sizes and their main parts.

The results of these long-term excavations are published in a series of volumes; the one referring to Elephantine in the Middle Kingdom is volume XVIII (Von Pilgrim 1996). The series provide comprehensive information on architectural remains and material culture. From an architectural point of view, the volumes are particularly rich in technical details regarding construction and provide adequate house plans. They also provide an insight onto the site's various building phases.

With regards Tell el-Daba, the excavators gave a detailed set of descriptions applicable to all houses immediately following the foundation of the settlement, given that all of them were planned with the same arrangement. All descriptions belong to the comprehensive and detailed publication of the Tell el-Daba excavation reports, specifically volume IX which deals with Middle Kingdom remains (Czerny 1999). Similarly to Elephantine, this volume is part of a series which offers a comprehensive recording of architectural features and information regarding building phases, technical details and dimensions.

The vast majority of the houses in Lisht have not been published in detail. A contribution by F. Arnold (1996) however, includes information about several of these houses, amongst them house A.1.3 and A.3.3. All descriptions in this section refer to this publication. This is a short article published to summarise the findings and therefore takes for granted many pieces of information for which evidence is not provided; it is therefore difficult to separate the raw data from the interpretation done by the author.

All information regarding the description of house E at Deir el Ballas corresponds to Lacovara (1990a, 1996). The former one is a short excavation volume, while the latter is an article which briefly covers the site's findings. Due to the fact that the excavations were not completed, some details are missing; in addition, the denomination given to house rooms changed between both reports.

Tell el-Daba, volume XI (Hein and Jánosi 2004), deals with Second Intermediate Period structures, while information from Memphis comes from Jeffreys (2006). The same description given for volume IX of Tell el-Daba applies to volume XI in terms of quality and accuracy. In comparison, the Memphis volume is much more condensed, with descriptions being more summarised and house plans not as detailed.

All the information regarding houses in Amarna's Main City is extracted from Borchardt and Ricke (1980), apart from N49.18/58 (Kemp and Stevens 2010). These two sources exemplify the progression in archaeological excavation reports and their priorities; the first piece of work, undertaken in the 1930s, contains hundreds of houses; it offers a brief summary of each house, concentrating on location, brick sizes, construction. This publication is invaluable in the amount of information about house plans provided, and constitutes a remarkable effort; however, this is in detriment of the quantity of information given about each individual house. In contrast, Kemp and Stevens' volume is entirely dedicated to the study of one particular house. As such it has no parallel, nor does the amount of detail provided and the abundant graphic material.

The description of features at Karnak is based on the research of Anus and Saad (1971), the preliminary research of Masson (2008) and Millet and Masson (2011). It is important to note that the publication of the reinterpretation of the houses in this quartier by Aurélia Masson is forthcoming and that that publication is likely to change what is contained here as much research has been done on the stratigraphy of the area (pers. comm.); nevertheless, the contested area (house VII) has not been included in this sample. Therefore, although Anus and Saad's chronology can no longer be accepted and their description of features is limited, they are detailed enough to provide an understanding of the remains.

Lastly, the description of houses at el-Ashmunein was published by Spencer (1993). The information contained in this volume refers to site W and site C. The strength of this publication is that of providing abundant information about building phases, as well as considering aspects which are often neglected in other archaeological reports, such as wall foundations or brick bonds. On the other hand, the fact that the remains are organised by stratigraphic level has been criticised for obscuring the description (Aston 1995, 269).

4.1. Contextual background

4.1.1. Introduction

The aim of this section is to analyse the various contextual factors previously identified through the study of modern mudbrick houses (chapter 3), from general to particular and including: environmental conditions and man-made alterations to the environment, sociocultural considerations, community circumstances and individual choices where recognisable.

First, it seems appropriate to give an overview of the dynamics concerning the historical environmental conditions in the Nile Delta and valley, which are applicable to all periods covered by the data; these conditions would have had a direct influence in settlement locations and thus might have also indirectly affected the distribution and appearance of ancient Egyptian mudbrick houses.

Then, an overview of sites per period will be presented; these are not intended to give an extended account of historical events but rather to place the site within the context of the period bearing in mind the various contextual levels already mentioned.

4.1.2. Historical environmental conditions in the Nile Delta and the valley

The most repeated statement highlighting the importance of Egypt's hydrography for its cultural development was written by Herodotus in his *Histories* (Book II, 5):

‘Egypt is a gift of the Nile’. It referred to the paramount importance of the annual flood of the Nile, which periodically renewed the land’s fertility. While the truth of this statement is incontestable, the hardships also brought by the annual flood cannot be left out of the equation. Both realities, positive and negative, are essential to understand life in Egypt from antiquity until the damming of the Nile within the past 150 years.

The Nile provides a source of water which is channelled by artificial canals over the Nile valley, the Fayum depression and the Delta (see Fig. 2.10). All valley and Nile delta settlements are within the floodplain and are reliant on this water, while desert settlements rely on oasis water.

The development of the floodplain – and, consequently, of the settlements in it – was strongly influenced by the annual flood. Although early sites, such as Naqada or Hierakonpolis were established at the edge of the floodplain, later Predynastic and early dynastic settlements moved to old levees on the floodplain, due to changes in Nile levels (Hassan 1997, 63). These levees were mounds formed by the repetitive deposition of sediments carried by the flood that provided higher ground protected from the inundation, therefore making it suitable for habitation. Another phenomenon, particularly in the south-eastern and central Delta, caused by the accumulation of sand, sandy clay and silt (Issawi 1976, 21) was the formation of *geziras* or sand islands, which also provided suitable high ground for settlements. With time, repetitive building increased the height of these mounds and, therefore, their protection from water (Van Wesemael 1988, 128), although occasionally high floods could have still destroyed certain settlements. Despite being on *geziras*, settlements were developed on their edges, in order to remain the closest to arable land and to the river, while still staying out of the reach of the inundation (Van den Brink 1993, 282). Between these *geziras*, further mounds –similar to levees– were created by narrower water courses, which were also suitable for settlement (Van den Brink 1993, 282). The complex system featuring the settlements indicates that the course of the river changed many times in the past (Van Wesemael 1988, 128; Bunbury *et al* 2009, 158).

Thus, most of the settlements across Pharaonic history developed on high ground on the floodplain (*geziras*), on the edge of the floodplain with the desert or along levees next to the river (Fattovich 1999, 1050). To these, some desert settlements must be added.

In respect to the flood, not only was its extent different every year, but also its impact varied in different geographical areas. A study of the Nile floods since the 7th century AD to the present, demonstrates an alternation between low and high Nile floods between periods from a few decades to a few centuries, with certain periods being notably unstable and characterised by droughts (Hassan 1997, 57) and a high degree of unpredictability (Hassan 1997, 59). Regional factors, such as variable river discharge, sea level fluctuations and climate oscillations also influenced the flood cycles (Van den Brink 1993, 281; Van Wesemael 1988, 119). Records demonstrate that the annual river discharge was subject to wet and dry periods through cycles of ten and a hundred years, which would have significantly altered the flow amount through major Nile distributary channels and their promontories (Stanley and Warne 2007, 11). In addition, the shape and landforms of the Nile floodplain suffered changes that altered the position and amount of arable land, as well as the access to irrigation and drainage (Hassan 1997, 60). All of these factors meant that the flood had a different impact on various settlements (Hassan 1997, 56).

This particularly affected the Delta, whose overall morphology suffered important modifications through history (Van den Brink 1993, 281). Sea level rose gradually between 15000 and 8000 BP; during that process, the shoreline moved southwards, absorbing former alluvial plain deposits, whilst the northern Delta region tilted to the northeast. The position of Nile channels during this period is not known (Stanley and Warne 1993, 631). By 7500 BP the modern Nile Delta had begun to form (Stanley and Warne 1993, 631). The Sebennitic channel transported sand to the coast; the accumulation of this sand created beach ridges, forming a barrier against lagoons and marshes (Stanley and Warne 1993, 631; Stanley and Warne 2007, 11). Around 4000 BP the northeastern sector of the Delta continued to move forwards while the north-central coast moved backwards. In spite of sand ridges controlling the extension of marshes, wetlands continued to be the primary ecosystem in the Northern Delta for a good part of Pharaonic history (Stanley and Warne 1993, 632). These marshes still characterise the northern Delta today, constituting a series of lakes that communicate with the Mediterranean Sea (Issawi 1976, 21). On the other hand, Lutley and Bunbury's (2008, 4) work suggests that before the end of the Old Kingdom (2575-

2465 BC; c. 4525-4415 BP), the Nile Delta head was situated further south (Bunbury *et al* 2009, 158; Jeffreys 2008, 6) and over time moved northward to its present position north of Cairo.

By 2000 BP, the delta had acquired a gentle form, but still had at least five distributaries with small promontories that took sediments to the coast during the annual flood. Large coastal dunes developed in the north central Delta (Stanley and Warne 1993, 632).

An environment distinct from the Delta is the Nile valley, which is divided into two main areas: an area to the east (Eastern desert), with rocky mountains and visible valleys, that drains either to the Red Sea or to the Nile; and another area to the west (Western desert), consisting of a series of flat pediplains, located close to the river, meeting a high slope further inland. The pediplains are cut by shallow *wadi*s which form playas. Contrary to the Eastern desert, the drainage of the Western desert is internal (Issawi 1976, 5). The Nile runs in a channel cut through the rocks, with a floodplain either side no more than 23 km in width, at its maximum (Etheredge 2011, 3).

The landscape south of Aswan is characterised by faults which also influence the course of the river (Issawi 1976, 5). At Aswan, the geology of the area creates the perfect conditions for a cataract due to the mixture of igneous and sandstone rock but, further north, these characteristics are replaced by sand and silt islands. The steep rock overlooking the Nile at Aswan is substituted by parallel ridges on the west side of the Nile, while the east side continues to be scarp (Issawi 1976, 8), except for a few areas, such as the Kom Ombo plain. The river expands and the cultivable land increases in area (Said 1990, 10).

In Luxor, the river passes by the Qena bend, where it is framed by limestone cliffs of over 300m high, after that the valley becomes wider (Said 1990, 10), reaching about 20km in width in places downstream from Qena and 10 km in average from Aswan to Cairo (Schumm *et al* 2002, 235). North of Nag-Hammadi, the river shifts towards the Red Sea and the valley becomes even broader. From Assiut, the western cliffs become considerably lower than those to the east of the river (Said 1990, 10). From this point to Cairo the river stays close to the right side of the valley (Issawi 1976, 15). Connected to the Nile valley by a narrow channel through the desert hills is the

Fayum depression, filled with alluvial land, which descends into the Birket Qarun Lake (Said 1990, 10).

The cultivable land available to the west of the Nile is larger throughout the course of the river, as this one tends to occupy the eastern valley (Said 1990, 10).

Across history, the Nile has constantly moved sidewards, the direction depending on the precise curvature of the river at that particular point; bends tend to move outwards and downstream unless forced otherwise by the desert edge; in any case, it is estimated that this movement could have reached up to 9km every thousand years. The rates for the Giza area exceed 2km per thousand years (Lutley and Bunbury 2008, 3).

In addition, the upwards and downwards movement of the river caused by the annual flood would have also had an influence on the landscape and its perception by increasing the visibility of certain landscape features or even regions, changes which would have become obvious given the east-west uniformity of the valley. In the Delta the desert margins themselves formed a unity with the floodplain and the effect of the flood would have also been that of visually highlighting contiguity between sites (Jeffreys 2010, 103).

As well as the movements of the river, the migration of the Delta head northwards and the disappearance of some branches of the Nile would have caused some settlements to become high and dry, which would have also influenced the favouring of certain sites above others, particularly for the selection of stable ground for capital cities (Lutley and Bunbury 2008, 5).

The importance of the Nile in both the physical and social geography of Egypt would suggest the need for a strict control of water resources; in spite of this, artificial irrigation does not appear to have taken place on a wide scale and management of this resource seems to have been limited to the digging of canals and to certain waterworks undertaken since the Early Dynastic period (Hassan 1997, 52). It would appear that basin irrigation, where water is placed in level, barraged areas, would have been considered sufficient at an early date; moreover, it seems that this process was organised at a local and not at a state level, with uneven success depending on the volume of the Nile (Hassan 1997, 53, 55).

Despite the fact that water resources do not appear to have been controlled directly by the state, the Nile was still of paramount importance in the functioning of the state: it acted as a means of communication establishing a connection between the different areas and facilitating the maintenance of a state administration. Nome capitals were linked to the state capital by the river and delivered their tribute in that manner (Hassan 1997, 56).

More importantly, the geomorphological differences between the Delta and the Nile valley played an important role in the distinct cultural evolution of the two areas (Hassan 1997, 52) and the perception of the differences between both areas is apparent from early times (Kemp 2006, 80).

Consequently, the particular geographical characteristics, with the importance of the flood and the movements of the river throughout time, would have been a contributing factor to settlement location. Nevertheless, other culturally-dependent factors could have also been responsible for such choices and their effect on the particular distribution of settlements – and their houses – within those sites; those factors will be dealt with in the following section.

4.1.3. Old Kingdom sites (c. 2686-2160 BC)

4.1.3.1. Giza

4.1.3.1.1. Environmental conditions

The site is located 12km north of Saqqara, on the most northern of the desert ridges located on the western side of the river, immediately before the valley opens to the Delta (Fig. 4.1). It consists of two areas which are separated by a wide wadi. The earlier southern part of this desert site features a high elevation; the northern one, a broad area at the end of which there is a scarp cliff towards the Nile valley (Goedicke 2000, 403).

Three processes operated in the site from a geological point of view in the past 5000 years; the river and its floodplain, the wadi separating both areas of the site and the desert and its sand (Lehner *et al* 2009, 158). It would appear from recent studies that the pyramids found in the site were originally built near a branch of the Nile, which swiftly moved further towards the east across time (Lehner *et al* 2009, 158), even between the time before the building of the pyramids and the completion of the causeway of Khufu pyramid (Lutley and Bunbury 2008, 5), and continued to move further away from the site until Late Antiquity (Lehner *et al* 2009, 159). This was partially deduced from the observation of a series of north-south roads denoting former levees and connected with east-west roads, some of which used to be above water during the annual flood and which are not built up, but follow the topography down to the floodplain level (Lutley and Bunbury 2008, 5). The topography of the site indicates that the movement of the Nile would have influenced the development of the site as a whole (Lutley and Bunbury 2008, 5).

4.1.3.1.2. Sociocultural considerations

The site of Giza, built from the 4th dynasty (c. 2613-2494 BC), was the maximum manifestation of the monumentality developed during the Old Kingdom. The development of these large building projects, whose execution was organized by the state, distinguished this period from the previous Early Dynastic Period (c. 3000-2686 BC) (Malek 2000, 83). Together with Saqqara and Abusir, Giza was the main royal cemetery of the period (Goedicke 2000, 397). It featured a series of monuments of which the central ones are the three pyramids (Fig. 4.2 left); to their east, there are pyramid temples, causeways, and valley temples; to the south and east sides of the Menkaure and Khufu pyramids respectively, Queens' pyramids are located, as well as large mastaba tombs to the east and west of Khufu's pyramid and a quarry to its southeast (AERA 2011). The site also included three settlements.

The site is a product of the religious and political circumstances of the period; the Old Kingdom emerged as a centralised state with capital in Memphis (Loprieno 1999, 39). It had an administrative elite who could be found in numerous local centres and enjoyed a certain degree of power and individuality (Loprieno 1999, 39). From a theological point of view, the changes produced in the early 4th dynasty, with a religious emphasis on the sun god – materialised in the construction of pyramids –, affected two essential Egyptian concepts: expectations about the afterlife and the Egyptians' relationship with the king (Roth 1993, 55). The king was the middleman between the gods and the people, although the worldly tasks pertaining to this relationship were performed by the priests (Malek 2000, 92; Richards 2010, 56). For the people connected to the king's funerary cult and buried near him, this dependence continued even in the afterlife, and monumentality was a means of expressing the importance of this relationship (Malek 2000, 93). In the same manner that this dependence existed, the king needed Egyptian people ‘as a stage for the fulfilment of his functions’ (Loprieno 1999, 42). The built landscape of the site showcased the importance of the king and expressed the relevance of the relationship between him and his dependants.

Overall, an equilibrium between state and local authorities was established, whereby the organization of overall resources was carried out by the state, but local administrators controlled the irrigation work and land management (Malek 2000, 95). Private land disappeared to be substituted by royal states, which were given to officials in reward for their services, land which theoretically reverted to the king at the end of those services (Malek 2000, 95). The king’s land produce was mainly destined to support those involved in the funerary cult, with a system of redistribution (Malek 2000, 96).

In order to be able to undertake these large building projects, it was necessary to deploy extra human resources, improve the administration and develop new ways of obtaining income (Malek 2000, 94); one of the most important effects was the need to increase agricultural production – in order to support those who had been removed from food production through the deployment of extra men for building projects. For those purposes, a process of internal colonisation appears to have occurred during this period which is most likely a consequence of pyramid building (Lehner 2010, 86). The workforce required for these projects was drawn from village households (Lehner 2010, 98).

However, during the 5th dynasty (c. 2494-2345 BC), those intrinsically dependent on the king – such as priests and officials – increased their power and independence (Loprieno 1999, 41) and consequently throughout the 6th dynasty (c. 2345-2181 BC), the authority of the king started to diminish. This process was encouraged by the administrative reorganization of various kings, who bestowed extremely high titles to recognise the autonomy of provincial governors in an attempt to counterbalance the powerful bureaucracy at Memphis; however, this only debilitated the central state further (Baer 1960, 302). As well as the titles, the highest provincial officials assumed the king’s paternalist discourse and the system of power relations based on kinship (Baud 1999, 379). This kinship relationship, which originally linked the king with his officials, lost prestige at the beginning of the 5th dynasty with the emergence of a society which valued merit over birth, despite the fact that this kinship relationship did not ever necessarily imply real blood links, but only family-like ties (Baud 1999, 377). In any case, the increase of the power of the local elites would have most likely brought the debilitation of the state and the end of centralisation (Loprieno 1999, 41; Malek 2000, 106-107).

It is possible that, in addition to power dilution, other factors, such as environmental circumstances, including low river levels and lesser rain, contributed to the disintegration of the state (Malek 2000, 107).

4.1.3.1.3. Community circumstances

The so-called Khentkawes Town (Fig. 4.2 right), currently the object of study, is a settlement partially occupying the causeway of the Khentkawes monument, east of the main pyramids, covering an area of 6402m^2 (Lehner *et al* 2006, 12). Although apparently L-shaped, excavations indicate that the town continued further east from the eastern houses and therefore it would have originally had a different shape (Lehner *et al* 2009, 12); the continuation towards the east was at a lower level (Tavares 2008, 10) where what could be a valley temple for Khentkawes was located. Apparently, both areas were linked via a ramp (Tavares 2008, 11). The reason for the L-shape was that the eastern town wall ran in parallel to a vertical bedrock ledge that dropped more than 2m.

Therefore, the town was divided by the causeway (c 1.70m wide) and consisted of ten houses surrounded by thick enclosure walls, of an average size of 80m^2 and a perpendicular set of two –perhaps three- other houses of over 100 m^2 in area (Lehner *et al* 2006, 12).

The town was most likely inhabited until the end of the Old Kingdom and had two construction phases (Tavares 2008, 9). It would appear that the eastern buildings (I, J, K and L) were constructed prior to the causeway and therefore to the other buildings, as suggested by the western wall of Building I (Lehner *et al* 2009, from Yeoman's reports: weekly report 07iii15); this area was also occupied longer (Yeomans 2007b, 26 in Lehner *et al* 2009, 9). Linked to these four buildings were also the remains of an eastern entrance giving way to the causeway, of which a limestone pivot socket remains (Lehner *et al* 2009, 9). A threshold with a pivot socket and a jamb was also found forming an entrance on the northern enclosure wall (Lehner et al 2009, 11). A street ran south-north between buildings K and L and I and J. In a later phase, when a narrower causeway was added, a tunnel was excavated to maintain access between buildings I-J and K-L via the north-south street (Tavares 2008, 10).

The space south of the Khentkawes town and in front of the Menkaure Valley Temple would have been covered by a broad ramp ascending from east to west (Tavares 2008, 11).

Both the Menkaure Valley Temple village and the Khentkawes Town were located at the southern end of the plateau, on slightly higher ground than the Lost City, and were linked to temples (Tavares 2008, 8); both could have served the function of providing access to the necropolis (Tavares 2008, 11) and were most likely inhabited by priests who carried out afterlife rituals for the kings (Tavares 2008, 8), at least for a certain period of their occupation. The role of Khentkawes inhabitants was therefore to perform the relevant tasks to fulfil the relationship between the gods and the people as discussed above (Malek 2000, 92; Richards 2010, 56).

4.1.4. Middle Kingdom sites (c. 2055 – 1650 BC) (Fig. 4.3)

4.1.4.1. Kahun

4.1.4.1.1. Environmental conditions

Kahun (Fig. 4.4) (also known as Lahun, el-Lahun or Illahun) is situated in the Fayum Oasis, an area which is usually considered a part of the Nile valley, despite having particular environmental conditions (David 1996, 40). The oval-shaped oasis is nowadays situated 64km away from ancient Memphis, surrounded by the Libyan mountains (David 1996, 40). The oasis is formed by a lake – known nowadays as Birket el-Qarun – which is fed by both numerous water springs and the Bahr Yusef, an arm of the Nile which reaches the lake via the desert hills, later splitting into different channels (David 1996, 40). This lake is much smaller in current times than it was in ancient times, although the exact position and extent of the lake in ancient times is not certain (David 1996, 40).

This environment propitiated a fertile landscape of abundant vegetation, particularly in the middle of the lake, where the land was much fertile due to the silt deposited by the Bahr Yusef. The fertility of this area was well known in ancient times. Amenemhet I (12th dynasty, c. 1985-1956 BC) enlarged the channel between the Nile and the Fayum depression, consequently allowing a much larger volume of water to pass into the lake every year; this increased the protection from excessively high floods while also increasing the available water after the flood (Ball 1939, 199); in addition, a series of land reclamation projects with the aim of increasing the building and agricultural areas, turned the Fayum Oasis into a desirable place for hunting, fishing and other royal pastimes (David 1996, 41-2). Through artificial control and a decrease of the amount of water flowing into the basin, the lake surface was quickly evaporated and the available land increased (David 1996, 41). To avoid re-flooding of these areas, a system of dykes and drainage canals was built. Senwosret II was most likely the first to build a barrage across the mouth of the Hawara Channel, near Lahun. Amenemhet II (12th dynasty, 1911-1877 BC) would have continued this reclamation, gaining over 17000 acres of new, usable land around Crocodilopolis (modern Medinet el-Fayum) (David 1996, 41).

4.1.4.1.2. Sociocultural considerations

Kahun might have emerged as the reflection of a society which existed under the full control and planning of the state (Kemp 2006, 217), a control which would have been necessary to undertake major building works and would have resulted in state-planned cities similar to Kahun.

In contrast to this idea, there is a suggestion by other authors that only certain aspects would have been controlled by the state in the Middle Kingdom and that a certain 'moral economy' would have emerged during this period (Richards 2000, 43-45 quoted in Wegner 2010, 121). Support for this view is suggested by the presence of literary texts which could be interpreted as containing some form of criticism of the authorities, such as The Story of the Eloquent Peasant. Another source supporting this theory could be the information contained in papyri such as the Heqanakht papers, where the private owning of land and the possibility of related transactions without state involvement is documented (Grajeztki 2006, 142), suggesting an increase in social responsibility during this period (Wegner 2010, 120).

From an administrative point of view, the Middle Kingdom developed a successful and elaborate bureaucratic system. This process of state construction was progressive and the reign of Senwosret II (12^{th} dynasty, 1877-1870 BC), when provincial powers finally disappeared to be replaced by an administrative network (Wegner 2010, 133), appears to have been a key point in this progression (Wegner 2010, 122). The completion of this process took place by means of the integration of state and local communities (Wegner 2010, 122). The type of administration developed has been defined by Lehner (2000, cited in Wegner 2010, 135) as corresponding to a 'patrimonial household model', with the local administration functioning as a small-scale version of the royal household, having control over economic activities, the temple and its goods. The evidence suggests that this administration must have been carried out mainly from Itj-Tawy and Thebes (Wegner 2010, 134), a city which retained an important administrative status throughout the period (Wegner 2010, 140).

In addition, there could have been a 'democratisation' of cultural practices, particularly funerary ones, due to the now possible access of the local elites to practices previously exclusive to central elites (Wegner 2010, 123). This 'democratisation of the afterlife' (a concept first suggested by Breasted (1912, 272) and then Gardiner (Gardiner and de Garis Davies 1915, 55, note 1) cited in Hays (2011, 116-117)) is the subject of disagreement amongst scholars (see David 2002, 154 cited in Hays 2011 for its use and Hays 2011 and Smith 2009 for arguments against it). Wegner (2010, 124-132) cited its importance as just one example of a series of social changes in Egypt denoting modifications in divine conceptions; these changes would have materialised in a stronger religious presence in everyday life that gave way to new material manifestations, which in turn might have had a reflection on domestic remains.

4.1.4.1.3. Community circumstances

Kahun was laid out following an orthogonal plan (Fig. 4.5), possibly by the same architect who had built the pyramid of Senwosret II (David 1996, 104). The town had a rectangular shape and was surrounded by a thick brick enclosure wall. Two parts could be distinguished within the town: the western area which contained smaller houses belonging to workmen; and the wealthier areas located in the east, both parts separated by a thick wall which also appears to have marked a change in ground level, the western part of the town being higher than its eastern counterpart (David 1996, 104). The streets were arranged in rectangular lines, facilitating the supervision of the western quarters.

Petrie distinguished the following areas in the town: the acropolis and the guardhouse (with an area of c. 2700 m^2), five great houses on the north wall (each over 2700 m^2 in area), three great southern houses (each over 2700 m^2), the storerooms and the workmen's streets behind them, the dwelling houses joining the west wall (c. 135m^2 each), the five workmen's streets on the east (c. 40m^2 each) and the eleven workmen's streets in the western area (c. 100 m^2, c. 135 m^2, c.168 m^2) (Petrie 1891, 5; generic gross areas after Quirke 2005).

The town extended north, west and partly eastwards, but was open on the south side; however, according to Petrie, it could have originally been walled on four sides, since he found remains of a gateway on the east wall (David 1996, 104).

The so-called 'acropolis' was the highest area of the town, an area which had been preserved less well than the rest of the town. The buildings here stood on a banked platform from which all the roofs of the town could be seen (Petrie 1891, 6). The acropolis was occupied by a large house that had been deserted early in the town's history, which could have served as the king's residence during his inspections of the pyramid (Petrie 1891, 6). David (1986, 106) did not contradict this interpretation, while Quirke (2005, 55) suggested it could have been the house of the mayor of the town.

The five large houses along the north wall were practically identical, four of them being terraced and one detached. In between the terraced houses and the detached one, there was a narrower house with a different plan (Petrie 1891, 5).

The three large houses on the south side, were the same size as the five already described, but with different arrangements. They were difficult to plan due to numerous changes. Nine storerooms were located at the back (Petrie 1891, 7). Against the thick wall which divided the town, there were blocks of dwellings or stores (Petrie 1891, 7). Behind the southern mansions, there were five streets of workmen's houses, and to the east, additional small dwellings. In the western town, there were eleven streets containing further workmen's houses (Petrie 1891, 21).

The materials found in the houses – objects and papyri – provide much information regarding the functioning of the town. The papyri offer information about the legal, medical, educative and religious system. They also show that the town is not only an example of a large pyramid town to house the priests and people responsible for the cult of the king as well as the workmen of the pyramid; it was also home to a broader community involved not only with the priestly foundation but also with many other unrelated areas (Kemp 2006, 211). Whether there were people occupied in agriculture is not known (Kemp 2006, 211) although tools such as ploughing tools and sickles, were found in the houses (David 1996, 146).

Aside from its mixed population, the town is characterised by its dependence on a strong structural administration and bureaucracy, which appears to have influenced both the practical and the physical organization of the town (Kemp 2006, 217, 221). The town was planned and organised into two groups, those considered as high-ranking and those who were not, with what appears to be an artificial homogenization of the second group (Kemp 2006, 217). The internal organization of the town meant that many people depended upon large residences which would have acted as food redistribution centres, rather than on a single granary with a joined administration (Kemp 2006, 220), as shown by the presence of granaries in individual houses (Kemp 2006, 216).

4.1.4.1.4. Individual circumstances

Nevertheless, some individual circumstances can be inferred; census lists have survived which reflect fluctuations in the number of family members, such as in the household of Hori and Sneferu (Kemp 2006, 221). There is a great deal of individual variation within the houses which is likely to reflect individual circumstances (Kemp 2006, 217).

Despite the highly bureaucratic character of the town, some papyri show that the individuals had a high degree of freedom in legal matters such as property sales (Kemp 2006, 221).

Although the objects found offer a wealth of information regarding everyday life in an ancient Egyptian town in the Middle Kingdom, a major problem is that objects were not always recorded in situ by Petrie, therefore we do not know the provenance for most objects listed in his accounts (Gallorini 1998, 42).

4.1.4.2. Elephantine

4.1.4.2.1. Environmental conditions

Elephantine (Fig.4.6) is an island in the river Nile located by the northern access of the First Cataract (DAI 2011). This natural barrier made the town strategically important for river communication. In addition, there were large deposits of mineral located nearby (Baines and Malek 1980, 72). However, at the same time, this was an almost infertile area where the valley was extremely narrow and desert plains bordered it to the east and west (DAI 2011). For this reason, food, most probably, had to be brought in from the north (Baines and Malek 1980, 72). All that remains in the present day is a mound c. 350m wide and up to 15m high (Kaiser 1999, 335).

4.1.4.2.2. Sociocultural considerations

Elephantine is embedded in the political and religious circumstances of the Middle Kingdom. It has been suggested that a middle class could have emerged at the town as a consequence of the climate previously described, in which there was a possible democratization and increase in social responsibility. The evidence used to argue for the existence of this middle class is that of papyri which lists individuals with no titles and others named ‘man of this town’, who would have also had no titles and restricted access to military, religious and writing sources (Quirke 1991, 149). According to Richards (1997, 40) cemetery data from Abydos, as well as textual sources (Middle Kingdom administrative documents and letters) suggest that there would have been socioeconomic levels which would have escaped the government control. Andrássy (1998, 57), using the Kahun papyri and Papyrus Berlin 35.1446 recto, described this class as having been formed by small and mid-level employees of state institutions, including the temple personnel, specialized craftsmen attached to these institutions, ‘men of this town’ and citizens without titles. There are also certain decorated burials where administrative titles are absent, such as the burial of Senwosret-ankh at Harageh, or hundreds of coffins at Asyut (Grajeztki 2006, 150); perhaps, however, these titles were simply not placed there or have not survived, they could have also belonged to the ruling class but not bear titles i.e. women (Grajeztki 2006, 150). Therefore, the issue of the existence of a middle class could be probably raised as much for this period as for any others (Grajeztki 2006, 151).

In any case, the emergence of military career officials and the sophistication of army organization is apparent (Wegner 2010, 121). This promotion of the military would be related to expansionism, as reflected during the 11th dynasty, when the south border was extended into Nubia. Since the time of its early settlement in the middle of the 4th millennium BC, Elephantine had been a significant trade centre, but with the expansion of the southern border it became an important administrative and economic centre (Kaiser 1999, 338). Both governor tomb inscriptions and stelae speak of Elephantine's role in controlling the trade between Egypt and Nubia, as well as of the numerous campaigns carried out by the king in the latter (Grajetzki 2006, 84-85). Elephantine was therefore the most important town in the area (Grajetzki 2006, 80).

Religiously, Elephantine was highly relevant, as suggested by the presence of a number of temples, including a sanctuary to Heqaib, a local Old Kingdom governor turned holy man, whose sanctuary was adorned with stelae and statues throughout the duration of this period. A great deal of investment in local cults can be seen, while Elephantine was also the centre of a wider celebration, the feast of the Nile (DAI 2011). This could be related to an apparent use of archaism for legitimation purposes during the Middle Kingdom, in spite of the importance of local centres (Wegner 2010, 139).

4.1.4.2.3. Community circumstances

There is evidence of settlement on the island for a period of 4000 years (Kaiser 1999, 335); however, due to the land scarcity mentioned, Elephantine would have never enjoyed a large population (Grajetzki 2006, 84). During the Middle Kingdom, Elephantine was arranged in a nearly orthogonal street pattern, a pattern that can already be observed in the late 3rd millennium BC (DAI 2011). In the late Middle Kingdom, a new town enclosure was probably built to include the settlement areas that had developed in front of the old town enclosure (DAI 2011). Aside from the North City, the residential area extended south of the temple of Khnum (Fig. 4.7).

Due to the city's main roles, the community would have been varied; it is suggested that most inhabitants would have been involved in administration due to the abundant number of scarab seals found (DAI 2011). The frequent changes in the border would have meant that some of the other inhabitants would have been involved in trade, as well as there being military personnel, although both roles were probably combined. It is also possible that *medja*-nomads lived in small settlements in the outskirts of Elephantine although their presence is also visible across the site (DAI 2011).

4.1.4.3. Tell el-Daba

4.1.4.3.1. Environmental conditions

Tell el-Daba (Avaris) (Fig. 4.8 left) is situated in the Eastern Delta, an extremely flat area (Bietak 1996c, 1) characterised by the presence of numerous *gezira* mounds. The settlement had been founded upon several of the *gezira* mounds to the south of deviation F2 of the Pelusiac branch, a branch of the Nile now disappeared, that was navigable and had access to the Mediterranean Sea (Bietak 1996c, 3). This sea route coincided with a land route created by a road coming from northern Sinai, the 'Horus Road', which continued towards the site of Avaris thanks to an opening in the Bahr el-Baqar drainage system situated to the east (Bietak 1996c, 3). To the north, an opening in this drainage system allowed the Horus Road to continue towards the site. The sites of Avaris and Piramesse were thus the points of control of the junction between the land and the sea route, which gave access into the Delta (Bietak 1996c, 3).

4.1.4.3.2. Sociocultural considerations

The city of Tell el-Daba appears not to have been of any particular importance during the Old Kingdom (Grajeztki 2006, 131-132). At the beginning of the 12th dynasty, a royal domain with a temple was founded by Amenemhet I to the south of deviation F2 of the Pelusiac branch. On the *gezira* mound to the south, a planned settlement was also founded, consisting of small houses arranged in blocks of 12 or more units. This settlement was only occupied for a short period of time and was first designed to house the workmen that took part in the construction of the mentioned royal domain (Bietak 1996c, 5). In the 12th dynasty, a north town was established around a temple in the site of modern Ezbet Rushdi (Grajeztki 2006, 132), which seems to have increased its importance at the end of the 12th dynasty and during the 13th dynasty (c. 1773-1650) (Bietak 1996c, 10). According to Kees (1962 cited in Bietak 1996c, 10), the site as a whole gained importance as a result of Egyptian mining expeditions to Sinai and of trade with the Levant.

4.1.4.3.3. Community circumstances

The planned settlement was given the name F/I (Fig 4.8 right). Some sections of an enclosure wall were uncovered along the north edge (Czerny 2008). Within the settlement, 342 small houses were recorded, although the original settlement must have included more houses towards the west, south and possibly east (Czerny 2008). All houses were designed with the same size and shape. Twelve houses formed a block in the eastern row and possibly twenty-four in the western row (Czerny 1999, 17), with the two northernmost blocks near the enclosure having 6 and 12 houses only. Of this, 17 double blocks were excavated. In the northeast corner, there was a large building and south of it only an open space (Czerny 2008) which was probably used for keeping cattle at night (Bietak 1996c, 9).

Originally, the area of these houses was of only c. 25 m^2 each (Bietak 1996c, 9), with each house having four rooms facing two sides of a courtyard (phase e/3). However, there are hardly any original remains left, because soon after the end of the construction work, the houses began to be altered; although the basic plan was generally maintained, houses were merged and extended over an unknown length of time (e/2) (Czerny 2008). At the end of phase I/2, the inhabitants presumably abandoned the site, taking all the goods and partially walling up the entrance doors to their houses. After that time, the site appears to have been used only for waste disposal for an undetermined period of time. Eventually, new, much larger and irregular houses were built over the remains of the original ones, although the original streets and block edges were maintained (Czerny 2008). Houses with large courtyards with space for animals and storage, arranged freely, were built instead of the small houses found before. The walls of the old streets were used as perimeter walls of farmstead buildings or courtyards (e/1). This change might be explained by the fact that some of the workers who lived in the settlement could have left and moved to the new town in Ezbet Rushdi, constructed during the kingdom of

Amenemhet I. The site was finally abandoned during the reign of Senwosret I (c. 1956-1911 BC) (Bietak 1996c, 9).

Towards the end of the 12th Dynasty, at the time of building phase d / 2, the northern part of the settlement ruins was used partially as a cemetery.

The population of this settlement appears to be of northern Levantine origin, but with Egyptianised characteristics (Bietak 2010a, 139). In fact, there is evidence for Levantine people with different professions already living in Middle Kingdom Egypt (Bietak 2010a, 140). In part they seem to have been concentrated around the royal residence of Itj-tawy, while others became dispersed through recruitment in the military and expedition activities; some of them may have gained leading positions in the army or administration. It seems, therefore, possible that during the 11th and 12th dynasties part of the northern Levantine community in Egypt was concentrated in this special settlement at Tell el Daba (Bietak 2010a, 149).

4.1.4.4. Lisht

4.1.4.4.1. Environmental conditions

The environmental conditions of Lisht (Fig. 4.9) were those of desert edge, being located in the Western desert, an arid region covered by vast rolling plains of sand, shifting dunes and large depressions, with soil in this area being high in calcium carbonate. As a consequence, despite being on the desert edge, agriculture would have been limited.

4.1.4.4.2. Sociocultural considerations

Although the 12th dynasty originally re-established Memphis as their capital, towards the end of the reign of Amenemhet I a new capital was founded, called Itj-tawy (Wegner 2010, 121) which appears to have performed this role until the end of the 13th dynasty (Grajetzki 2006, 121), as did the cemetery located on the desert plateau, although it had been used from the Late Old Kingdom (Hölzl 1999, 538).

Itj-tawy was identified with Lisht by D. Arnold (1988, 14) as well as by F. Arnold (1996, 13). The location of the town was established thanks to pottery dumps, including a faience manufacturing site; however, the town itself lies beneath modern cultivation (Arnold 1996, 13).

Two kings built their pyramids nearby, Amenemhet I, whose pyramid was located to the north and Senwosret I, whose pyramid was located to the south; this second pyramid followed Old Kingdom traditions (Hölzl 1999, 539). Around both of them there were tombs of nobles; the cemetery that was built around the pyramid of Amenemhet I was used until the end of the Middle Kingdom, although the latest burials of the highest state officials disappeared after his death.

At the end of the 13th dynasty, the Middle Kingdom powers returned to Thebes, abandoning the control of the Delta and Northern Egypt in the hands of other powers, particularly the Hyksos (Wegner 2010, 121).

4.1.4.4.3. Community circumstances

The settlement, from approximately the 13th dynasty (Grajetzki 2006, 125), grew organically in the space between the two pyramids. The evidence points to the connection of the population, which already lived in the necropolis during the 12th dynasty (settlement phases I b and c), to the funerary cults of Lisht-North (Arnold 1996, 13). The population increased at the beginning of the 13th dynasty with the arrival of more priests and cemetery officials (phase II a). Isolated houses were built in certain areas, while cemetery activity continued (Arnold 1996, 13).

The settlement appears to have continued in a limited way into the beginning of the Second Intermediate Period. The final abandonment of the site appears to support the theory of a general demographic change taking place at the beginning of the Second Intermediate Period, when Kom Rabia in Memphis was also temporarily abandoned and the population of other sites such as Tell el Daba and certain sites in the Delta increased (Arnold 1996, 19).

Arnold (1996, 13-15) used the quality of the objects and the size and characteristics of the uncovered buildings – in relation to those of Kahun, Amarna and Deir el Medina – to determine that the population of Lisht was composed of a middle class, including lower ranking officials and specialised craftsmen. Although he conceded that factors other than wealth could have influenced the size of houses, he classed the population of Lisht as of a higher status than the workmen of Kahun, but a lower one than the high officials who allegedly lived in the Kahun mansions (Arnold 1996, 15). Since these houses were of a similar size to those found in Elephantine or in

Khentkawes Town in Giza, their inhabitants were likely to be of a similar status (Arnold 1996, 15). This interpretation was solely based on house size and will be further explored in the 'distribution and use of space' section of this chapter.

4.1.5. Second Intermediate Period sites (c. 1650-1550 BC) (Fig. 4.10)

4.1.5.1. Tell el-Daba (Fig.4.8 left)

4.1.5.1.1. Environmental conditions

The environmental conditions in this period are presumably the same as those described for the Middle Kingdom, with no indication of variation whether natural or man-made. Nevertheless, possible variations could have included the position of the river and the state of the river branches as described in the 'historical environmental conditions' section.

4.1.5.1.2. Sociocultural considerations

At the beginning of this period, the 13th dynasty seems to have lost control over the Delta, following the establishment of a local dynasty at Avaris (Tell el-Daba) (Bietak 2010a, 151). However, the extent of this power was reduced to the eastern Delta and perhaps other Delta areas; there is no evidence to suggest that it extended further (Forstner-Müller 2010, 135).

Recent studies (Ryholt 2010, 109) have shown that the power established by the Hyksos in the Delta became autonomous much earlier than thought, and consequently the culture associated with it was consolidated earlier.

The Second Intermediate Period is a difficult period to define chronologically; the main point of discussion is whether the period should include the 13th dynasty, but it is out of the scope of this section to enter into great detail about the arguments for and against it. Generally, while some Egyptologists consider this dynasty to be part of the Middle Kingdom as mentioned in the description of Lisht (Shaw 2000), others (Ryholt 1997, Marée 2010) include it within the Second Intermediate Period.

Overall, the evidence, including funerary, appears to indicate a widespread decay of economic prosperity during the Second Intermediate Period. The situation could have had its origin in environmental changes, political powers emerging both in the north and the south, and other issues such as succession problems (McCormack

2010, 81). In any case, there was a moment of social, political and economic crisis as a consequence of a deterioration of centralised power and, consequently, an increase in the importance of regional centres occurred.

This regionalisation affected the system at different levels; for example, in social relations, where there was a development of local ties encouraged by the lack of a strong central administration (Kubisch 2010, 313). A more thorough integration of the individual into the community seems evident from cemetery arrangements and architecture (Seiler 2010, 51). From a cultural point of view, however, this structural disintegration had an effect on material culture, promoting the appearance of local styles with the consequent rise in innovative production. This regionalism started developing from the 13th dynasty, although still following on from the Middle Kingdom style (Seiler 2010, 52).

4.1.5.1.3. Community circumstances

Area A/V (Fig. 4.32) was located on the southern side of a *gezira* mound, around 500m to the northeast of A/I and A/II. It would have been part of a larger settlement which was separated from the main *tell* by a water channel (Hein 2008). The period of occupation of this particular settlement appears to have extended for the totality of the Second Intermediate Period, having only started at the beginning and coinciding with an increase in population, which would have exceeded the capacity of older settlement areas (Hein 2008). This increase in population would have been linked to an influx of Canaanites towards the end of 12th dynasty, who brought about a different cultural character. From the late 12th dynasty, new settlers from Syro-Palestine occupied the land south of the Middle Kingdom town (Bietak 1999, 949). The presence of burials within the houses and of a certain house plan typical of north Syria have been used to justify the Syro-Palestinian origin of the settlers (Bietak 1999, 950). Despite a certain degree of acculturation, the archaeological record not only shows a distinct cultural character of the community but also the princely status of some of its leaders (Bietak 2010a, 150). The people who lived in the A/V village are likely to have been employed by the king as soldiers, as well as perhaps being involved in other specialised fields such as caravan leading and trade due to the site possibly being used to launch mining expeditions to Sinai or sea expeditions to the Levant (Bietak 1999, 950).

4.1.5.2. Deir el-Ballas

4.1.5.2.1. Environmental conditions

Deir el-Ballas (Fig. 4.11) is located on the east bank of the Nile in northern Upper Egypt, about 10 km south of Dendera. The ancient settlement stretched out along the desert edge of cultivation for approximately 2km, although originally it could have reached the present edge of the town and nearby fields (Lacovara 1999, 289). The terrain is a low gravel plain dissected by *wadi* beds and circumscribed by a wide bay opening up in the limestone cliffs of the high desert (Lacovara 1990b, 1, 2). Due to these characteristics, a comparison was suggested with the topography of Amarna (Lacovara 1996, 139).

4.1.5.2.2. Sociocultural considerations

The Second Intermediate Period is now most commonly defined as the period of Egyptian history when the north of the country was under the rule of Canaanite kings while Egyptian kings governed the south (Seiler 2010, 39). The conquest of Avaris by Ahmose, king of Thebes (c.1550-1525 BC), is considered the event that signalled the end of this period (Bourriau 2000, 172; 2010, 13). In this context, the archaeological evidence suggests that Deir el-Ballas would have probably acted as a temporary palace city for the Theban pharaohs during the Hyksos eviction (Lacovara 1999, 291). The short period of occupation starting in the Late Second Intermediate Period, would have ended in the early 18th dynasty (c.1550-1295 BC), with perhaps some brief squatter-like occupation later (Lacovara 1999, 290-291).

4.1.5.2.3. Community circumstances

North of the North Palace there were some houses of various sizes, which do not belong to a settlement as such (Fig 4.11 right) (Lacovara 1996, 142). In fact, despite the fact that these structures were given the name ‘houses’, none of them was deemed to be residential, except for the so-called House E.

From the perspective of urban development, Deir el-Ballas is considered to be a prefiguration of the so-called New Kingdom Royal city (Lacovara 1996, 141). This term was first used by Connor (1982 cited in Lacovara 1996, 139) to describe a type of city that seems to have emerged not long before the New Kingdom and that comprised temple/s, a central palace with dependent housing and a settlement/s (Lacovara 1996, 139).

Social differences within the site may be suggested by the presence of a possible workmen's village in the South Hill and several separate houses lavishly decorated next to the North Palace and in the South Wadi (Lacovara 1999, 289-290). However, an important part of the settlement has not been excavated, and further work remains to be carried out on those areas previously excavated (Lacovara 1999, 290).

4.1.6. New Kingdom sites (c. 1550-1069 BC) (Fig. 4.12)

4.1.6.1. Memphis

4.1.6.1.1. Environmental conditions

Memphis (Fig.4.13) is located 30km above the present head of the Nile Delta. Although nowadays the appearance of the site is that of a series of distinct mounds of various heights, it is likely that in ancient times this distinction would not have been so obvious (Jeffreys 1985, 4). These mounds can be divided into Kom Sabakha, Kom Helul, Kom al-Qalaa and Kom al-Rabia in the south – the latter comprising a series of sites, one of which is RAT, where the houses selected are located –, and Kom al-Fakhry, Mit Rahina, Kom Arbain, The Birka (a depression), Kom Khanzir, Kom al-Nawa, Kom Tuman, Kom Dafbaby and Kom Aziz in the north (Jeffreys 1985, 17-45).

Memphis was always described in relation to the river (Jeffreys 1985, 48); however, the archaeological evidence tends to suggest that the river position has not been stable throughout time (Jeffreys 1985, 49); in fact, there is evidence that the Nile in this part of the Valley shifted dramatically to the west after the 12th dynasty (Jeffreys 1985, 50). There is also evidence as late as the end of 15th century AD, that earthworks had been undertaken, which could point at the position of the early course of the river (Jeffreys 1985, 50). In summary, the bed of the river is likely to have been much closer to the settlement ruin field than today (Jeffreys 1985, 10).

Excavations in the SW of Kom Rabia and further to the north (RAT) demonstrated that early Ramesside levels to the west of the site lay 3m or more higher than contemporary buildings to the east of the site. The continuous downward slope to the east is explained at Kom Rabia due to previous occupation deposits of at least 4m in depth (Jeffreys 2006, 137); therefore, RAT is likely to have been built over an underlying riverbank that gradually evened out over time, as the course of the river shifted eastwards (Jeffreys 2006, 137).

There are several references to the 'islands of Memphis' in ancient texts, which probably portray the temporary islands that formed and re-formed around Memphis (Jeffreys 1985, 51). It is possible that one of these islands was home to a dockyard in the early 18th dynasty (Jeffreys 1985, 52); these islands would have merged with either side of the river or been buried underneath the alluvial silts, due to a +2m level rise in the plain level since Roman times (Jeffreys 1985, 53).

In terms of man-made alterations, Diodorus and Herodotus stated that a massive river barrage or dyke had been constructed in the mythical past by king Menes (Jeffreys 1985, 53) but its identification is difficult (Jeffreys 1985, 54). It is possible that there may well have been more than one river barrage. It would appear that the city of Memphis and its surroundings not only used these barriers as a protection from the river, but also as defence structures, as suggested by Diodorus for the barrage built by Menes (Jeffreys 1985, 54).

4.1.6.1.2. Sociocultural considerations

By the New Kingdom, Egypt was already a complex political entity. The foundations of the state were based on the combination of power distribution within society and the continuing importance of the divine monarchy; equally, myth continued to play an important part in this social structure (Kemp 2006, 247).

The different factions that formed Egyptian society since the Old Kingdom, such as the army and the palace, became institutionalised. At the same time, Egypt became an international power where imperialism took a primary role (Kemp 2006, 248). In parallel to this, the economic independence of the individual increased. The local temples acquired a more prominent role and were linked to the administrative institutions (Kemp 2006, 250).

Within this context, the importance acquired by Memphis throughout the centuries was consolidated.

4.1.6.1.3. Community circumstances

The New Kingdom settlement is located in Kom Rabia. There is evidence that this particular settlement was occupied from the Middle Kingdom (level VII) until possibly the beginning of the Third Intermediate Period (level IIa). The structures recovered from the site expand from level V to level IIa; they were a series of rooms, at both sides of a street leading to a silo in the southeast corner of the quadrant. New Kingdom occupation corresponds to levels IV (early New Kingdom) to II. Prior to level IIb (no earlier than the early 19th dynasty), no full house plans were identified (Jeffreys 2006, 12).

The New Kingdom settlement appears to be a mixture of planned and organic development, showing both a re-organisation of space in the early New Kingdom and some characteristics of previous planning practices. It would have responded to a reorganization of the social and cult space in the 18th dynasty after an abandonment of the site in the 13th dynasty and possible temporary occupation by the Hyksos. The excavated area appears to have been occupied by priests of Ptah cult to the East, which at least sometimes would have exercised some control over a mostly artisan community located in the centre and west parts (Jeffreys 2006, 137).

4.1.6.2. Amarna

4.1.6.2.1. Environmental conditions

Amarna (Fig. 4.14) is situated in a large bay of level desert, mostly surrounded by cliffs that rise c.100 m to a high desert plateau, with a distance of 10kms between the north and south cliffs. At its broadest, the site occupies 5km both the plateau and the cliffs are intersected by dry valleys and wadis (Kemp 2010). In the south east the line of the cliffs is replaced by a low and very irregular terrace which opens out to create a 3km wide flat valley.

Amarna, however, was not located in a convenient emplacement which would attract population and serve as an exchange point; instead, the location was most likely chosen following the desired religious symbolism of Akhenaten (Kemp 2006, 343) with the surrounding landscape resembling the horizon hieroglyph sign 𓈌 (Aldred 1976, 184).

4.1.6.2.2. Sociocultural considerations

A political event in this period which deserves separate attention is the emergence of Amarna as a political and religious centre for a short period within the 18th dynasty. Akhenaten broke with previous traditions to implement a programme of religious reforms, whose central point was the replacement of the traditional polytheistic system by a cult to a single sun god, Aten (Kemp 2010). Although this concept was not new, Akhenaten developed an original interpretation of the perception of the simplicity of solar religion which had a profound effect in art and architecture (Kemp 2010). As part of this reform, he founded the city of Akhetaten (Amarna), devoted to the Aten.

It is unclear immediately what happened after Akhenaten's death; however, not long after the new king Tutankhamun (c.1336-1327 BC) acceded, the court moved back to Memphis and abandoned the newly developed city. This gives a period of approximately 15 years of occupation (Kemp 2010).

The discourse concerning domestic architecture of ancient Egypt has predominantly been based on the findings at Amarna due to the quantity of remains available, as well as the richness of the material and the relative facility to draw conclusions about a self-contained community in a very specific period of time (Spencer 1993, 49).

Entering into a deep analysis of the political and social aspects associated to the period, over which there has been much discussion, is outside the scope of this research; however, a factor that might be potentially relevant for the analysis of the houses is the discussion regarding whether Amarna is a representative city of the New Kingdom, which is partially rooted in discussions regarding the renewed archaism or novelty of this period. According to Lacovara (1996, 139), a series of other sites share common characteristics with Amarna, therefore suggesting that this site was not exceptional. As described in the Deir el-Ballas section, a new type of city would have emerged from the end of the Second Intermediate Period which would have been characterised for being located 'in a wide bay opening up in the limestone cliffs, stretched out along the desert edge of the cultivation' and with a central royal palace, surrounded by habitation areas to the north and south (Lacovara 1996, 141).

On the other hand, the degree of representation of Amarna is put in doubt not only due to the exceptional political circumstances of the time, but also to practical aspects such as the unusual amount of space available on this site (Kemp 1977b, 125), which would have allowed the development of different architectural solutions. However, Kemp (1977b, 126) also recognises that it is possible that this circumstance was the product of a widespread replacement of dense towns located on mounds by new sites in the floodplain and therefore was in line with new trends in urbanism at the time.

4.1.6.2.3. Community circumstances

One of the main three areas into which the site of Amarna can be divided (Kemp 2010) contains the ancient city. What remains of it is an irregular strip of buildings running across 6 kms from the northern headland. The city has several parts: the Central City (which contains the main palaces, sun temples and administrative buildings), the Main City, which included the South and North Suburbs (Fig. 4.15). Further north from the latter was the North Palace, and beyond it, at the foot of the cliffs, the North City (Kemp 2010). This whole area is close to the river, which does not appear to have changed course much over time (Kemp 2010), unlike at other sites. Although the city might have extended to the river bank, cultivation appears to have destroyed most of it.

The residential areas seem to reflect individual preferences, within certain set limits (Kemp 2006, 216). Tietze's (1985, 84) study described houses in the Main City as ranging from densely built low-quality houses, to large compounds which included yards and various outbuildings; this variety is indicative of a society formed by individuals with extremely varied wealth and status (Kemp 2006, 217).

4.1.7. Third Intermediate Period sites (c. 1069- 664 BC) (Fig. 4.16)

4.1.7.1. Karnak

4.1.7.1.1. Environmental conditions

The environmental conditions surrounding Karnak have been studied in depth by a multidisciplinary team (Lutley and Bunbury 2008, Bunbury *et al* 2008). Their work focused on the study of island formation within the area, as well as the migration of the Nile in the area (Bunbury *et al* 2008, 351). New islands in the river appear and disappear at different times through history, as was also the case for Memphis (Bunbury *et al* 2008, 356).

The work confirmed that the area between the southern end of the 3rd pylon and the 8th pylon had once been a marsh or riverbank which existed before the 12th dynasty. The orientation of the 12th dynasty temples suggests that when they were founded, they were reached by water; therefore, the earliest temple of Karnak would have been on an island, with a former channel to the east (Bunbury *et al* 2008, 368). By the time of Akhenaten, the channel would have silted up, causing the island to be merged with the side of the floodplain; afterwards, the Nile continued to migrate in a northwest direction. Thus, the construction of the successive buildings from the First Intermediate Period (2160–2055 BC) throughout the New Kingdom and beyond, would have been influenced by the position of the Nile and the land it made available (Bunbury *et al* 2008, 351), in a similar way as has been explained for Giza.

4.1.7.1.2. Sociocultural considerations

As in the Second Intermediate Period, the influence of local centres, which was accompanied by population changes, increased during this period, with security personnel of Libyan descent and Nubians taking a more prominent role than before (Taylor 2000, 324). The Libyans became powerful through the increase of immigrants and settled population groups which formed dynasties at a local level (Taylor 2000, 328). During this period, Egypt also became more isolated (Taylor 2000, 324) although from the reign of Sheshonq I (c. 945-924 BC) there was a return to an expansionist foreign policy, recovering Egypt's position in the Levant (Taylor 2000, 329).

However, the control of some important resources was lost and this contributed to worsen an already debilitated economy as a consequence of civil war (Taylor 2000, 325). Towards the end of this period, there were also Nubian attempts of invasion (Taylor 2000, 331).

During this period, a series of rulers combined civil, military and religious powers (Taylor 2000, 327). Libyan control was fundamentally located in the western Delta, but also extended to the area between Memphis and Herakleopolis, as well as the oases of the western desert (Taylor 2000, 332). After Sheshonq I, several attempts to exercise power control across Egypt were stopped by provincial rulers (Taylor 2000, 330), mainly royal relatives who had acquired important powers through the king's favour (Taylor 2000, 335). Perhaps decentralisation was not seen in a negative light anymore, but instead was embraced as an accepted federal system (Taylor 2000, 338).

In the south there was more cohesion, with Thebes being still a major centre (Taylor 2000, 337). In this context, Karnak continued to play the major role that it had acquired during the Middle Kingdom as a religious, economic and political centre, and monumental buildings were constructed there (Bunbury *et al* 2008, 353). The monumental zone was expanded during the duration of the Middle Kingdom, and developed further during the New Kingdom's 18th-19th dynasties (c. 1550- 1186 BC). The structures continued to be added to and renewed until the 4th century BC; however, after the New Kingdom the footprint of the monuments does not appear to have extended much further, despite the river continuing its movement away from the site (Bunbury *et al* 2008, 354-55).

A recycling process in monumental building and funerary goods appears to have become widespread, whether due to less economic power or difficulty of resourcing (Taylor 2000, 344); perhaps, however, this had always been an important aspect of building works which is only more obvious during this period.

Later in the period (9th-8th century BC), the power shifted to Nubia, with the establishment of a dynasty of Kushite rulers (Taylor 2000, 351). By the late 8th century BC, the power concentrated in Napata, whose rulers increased their powers by becoming overlords of Nubia by the mid-8th century BC.

4.1.7.1.3. Community circumstances

The first settlement in Karnak has been identified as belonging to the First Intermediate Period (c. 2160-2055 BC). Some of the settlements were linked to institutional buildings, while others were connected to the town of Thebes (Millet and Masson 2011, 1).

In the Third Intermediate Period, there were residential areas to the South of Mut temple's sacred lake (Millet and Masson 2011, 5), east of the treasury of Tutmosis I (Millet and Masson 2011, 2), and within the treasury itself, behind the sacred lake of the Temple of Amun (Millet and Masson 2011, 5) and east and southeast of the sacred lake of the Temple of Amun (Millet and Masson 2011, 4). The houses east of the sacred lake of the temple of Amun are situated between the lake and the rampart and would have been occupied by priests only temporarily, during the three times a year when their services were required (Masson 2008, 7; Millet and Masson 2011, 5).

The stratigraphy of the houses east of the sacred lake of the Temple of Amun is complicated and it has now been proven that the priest quartiers date from a period later than the 21st dynasty (c. 1069-945 BC) (Aston 1996, 56 cited in Masson 2007, 593). On the other hand we cannot exclude the possibility that houses were built before the Third Intermediate Period, as early as the reign of Tuthmosis III (c. 1479-1425 BC), who could have already arranged for a sector against the new surrounding wall to be used for priest lodgings when he reorganised the temple and built the sacred lake and the rampart (Masson 2008, 2). In fact, there are indirect indications that these houses would have existed in some form during the New Kingdom from inscriptions found elsewhere that attest to restorations undertaken there (Masson 2008, 5, 6). The study of the stratigraphy of zone 7 has uncovered five main phases from the moment of the construction of the New Kingdom's rampart (phases 0 to 4) (Masson 2008, 4). In spite of this, the earliest physical evidence preserved for the houses of priests belongs to the Third Intermediate Period (phase 1).

4.1.7.2. El-Ashmunein (Fig. 4.18)

4.1.7.2.1. Environmental conditions

The site was located on sandy mounds, with an old Nile branch in the middle of a cultivation area, c. 2km wide (Roeder 1959, Fig. 88-89) on the west bank of the Nile. Processes of wind erosion, wind-blown dust and salt would have affected mudbrick walls on mound settlements in ancient times (Spencer 1994, 315). These same processes operating in modern times mean that the remains are scarce and badly preserved, as monuments in this site have been badly affected by salt crystallization and water (Bailey *et al* 1982, 1).

The archaeological mound (1 x 1.5km), formed by remains of mudbrick buildings (Spencer 1999, 168) was also particularly affected by the action of *sebakhin*

(Nöldeke 1931, 84 cited in Roeder 1959, 26), especially on the Eastern side; this ruinous state has prevented further excavation (Spencer 1993, 50).

4.1.7.2.2. Sociocultural considerations

Little can be said about the role played by the city during the Third Intermediate Period as not much is known about el-Ashmunein prior to the Graeco-Roman period, in which it was called Hermopolis Magna, aside from its being the capital of the Hermopolitan nome. The city was previously known as Khmunu, meaning eight, in reference to the Ogdoad (Spencer 1999, 168).

The core of the city was a sacred area, which included temples built and added to between the Middle Kingdom to the Roman Period (Spencer 1999, 169). The names Khmunu, Wenu and Hesret, given throughout history, appear to have referred indistinctly to the temple area and to the city as a whole (Roeder 1959, 26). Certain temple remains have been found belonging to periods from the Middle Kingdom, such as a limestone gateway of Amenemhet II (Spencer 1999, 168). Limestone blocks with inscriptions of Akhenaten were reused in later New Kingdom buildings and quarried from the nearby city of Amarna (Spencer 1999, 168), and they are also evidence of recycling attitudes during this period.

Probably from the New Kingdom, settlement developed around the sacred area. The sacred complex was rebuilt in 30th dynasty and a perimeter wall of nearly 2000 m was built to surround it, which cut across those previous settlements (Spencer 1999, 170).

4.1.7.2.3. Community circumstances

Site W denotes a space of 600 m^2 located in the northwest part of the mound. To the west of this excavation area was the high mound Kom Qassum (Spencer 1993, 11); to the east, the temple of Amun with its sacred precinct. The spread of the town in a northerly direction would have contributed to the extensive Third Intermediate Period settlement, west of the temple of Amun area (Spencer 1993, 50).

The domestic buildings excavated in Site W had come to be enclosed within the perimeter of the great temple enclosure wall of the 30th dynasty (Spencer 1993, 11). Settlement would have originally concentrated on the west of the enclosure, occupied by priests (Roeder 1959, 26). However, the rise in population and demands of wealthy inhabitants would have taken the settlement further westwards (Roeder 1959, 26). This settlement in the western area would have most likely been occupied by craftsmen (Roeder 1959, 26).

Within this period, three levels were distinguished; level 3 has been dated according to the pottery typology to 950-850 BC, level 2 to 850-750 BC and level 1 to 750-650 BC, but these phases would have partially overlapped (Spencer 1993, 50).

4.1.8. Discussion

A number of contextual factors, which were identified in the study of the modern sample as potentially having an influence on the distribution and appearance of ancient mudbrick houses, were analysed; these factors were subdivided into environmental, sociocultural, community circumstances and individual circumstances.

From an environmental point of view, the development of modern mudbrick houses within settlements was highly influenced by the artificial alterations to the Nile (see chapter 3); this influence seems to have been even greater in ancient times when there was no major control of the annual flood. Even capital cities such as Memphis and those at Tell el-Daba seem to have been at risk of flooding and river movement, affecting the location of settlement. Moreover, thanks to recent studies it has become clear that, in addition to the flood, the movement of the Nile would have also had an important effect on the distribution of sites, as seen, for example, in Karnak, where monuments developed throughout time in relation to this movement. The amount of space available within the site would have also potentially influenced this distribution; for example, the potential to expand construction in flat areas like Amarna would be much higher than in *gezira* sites, such as Tell el-Daba, which would have been hemmed by floodwaters or island sites, such as Elephantine, where the chances of expanding would have been naturally limited. The extent to which the space available within the site would have also influenced the specific distribution of houses will be further explored by comparing site and settlement areas (see 'Distribution and use of space' section in this chapter).

In chapter 3, the manner in which the recurrence, location and features of Egyptian mudbrick houses were indirectly affected by the political and economic developments in the country was examined and it seems that changes in the social and cultural structure also had a direct effect on the houses. One of the main physical changes brought by these developments has been the general transition from mud to red brick, which became a vehicle of social differentiation (Fakhouri 1972, 19). In ancient times, this material change is not documented; however, this implies that such a differentiation could have been expressed through other means, for example, through the use of more elaborate features. This possibility will be explored further in the 'Material and features' section of this chapter. In addition, the availability of marl clays in Middle Egypt and much of the valley could have resulted in harder bricks than those in the Delta, which would have been made with alluvial mud. This difference in material could have resulted in a better preservation of the former, both in ancient times and through to modern day, as they would have been more resistant to rainfall.

Physical modifications could have also been motivated by changes in tradition; within this aspect it is worth considering the revival of old traditions as a way of legitimisation, for example in Amarna, a trend which could have reached domestic architecture. There was a variation throughout ancient times in the balance between central and local powers, with the subsequent increase in certain periods of the importance of local centres with distinct local material production; this relative degree of independence and production of local types could have also filtered down to domestic architecture. Lastly, the influence of ethnicity should be considered, such as the adaptation or transformation of elements of other architectural traditions through immigration, for example as seen in Tell el-Daba and perhaps also at Kahun (David 1996, 249). Although the extent to which the specific political and social organization of a certain period affected the lives of individual people could be debated (Wegner 2010, 120), the potential influence of these factors should be taken into account.

Community circumstances are also relevant, particularly the context of the settlement within the period, its existence prior to the period or its foundation during the period in question as a consequence of a particular economic, political or social situation; in the case of planned settlements, the extent to which this original urban development limits or encourages variation in distribution and characteristics will be further explored in the 'Distribution and use of space' section of this chapter. The main function of the settlement during a given period and whether it was originally developed to suit such function could have had an influence on building responses, as some of those functions would have implied state control and institutional roles. In the sample, some settlements were planned to fulfil specific functions (Kahun, Tell el-Daba in the Middle Kingdom), developed organically as newly built cities (Amarna) or around monuments (el-Ashmunein, Lisht), or were frontier or trading centres (Elephantine, Tell el-Daba in the Second Intermediate Period). The 'Distribution and use of space' section of this chapter will explore whether these functions determine materiality somehow, therefore clarifying the importance of political issues and state control in domestic building.

In addition, the existence of contemporary settlements within the same site must be taken into account, as well as the particular segments of the society groups across the site which may be represented in each settlement specifically. This would also have a consequence on the degree to which it is necessary to show social differentiation within the site and could therefore affect the specifics of the house.

Lastly, the evaluation of the individual factors is difficult; however, sociocultural characteristics can reflect physically in the development and distribution of the house, as observed in modern houses, to suit the needs of the inhabitants, for example, extended families or specific household arrangements; in addition, the particular characteristics defining the inhabitants with regards religious beliefs and work occupation should also be explored; it must also be considered that, inevitably, the evidence for other social and cultural traits unknown to us might be difficult to identify.

Thus, as expressed for the modern mudbrick houses, the characteristics of ancient Egyptian houses are most likely to be the product of a combination of all these factors, sometimes difficult to identify and separate, and which must be understood holistically. The specifics into which these factors might have translated will be analysed in the following sections.

The main contextual factors points which might have affected mudbrick houses in ancient Egypt can be summed up as follows:

- The topographical position (mound, floodplain, desert) and the closeness to the river, which determined the access to building resources. An environmental study of the settlement surroundings can provide this kind of information.
- The importance of tradition materialised in culturally embedded and pragmatic practices. The influence of these factors is difficult to recognise in the archaeological record and can benefit from ethnoarchaeology.
- Political power movements influencing regional forms and the existence of external influences, which may be inferred from the study of material culture, for example pottery, and may then be tested on architectural remains.
- The longevity and linear development of the settlement, or alternatively, its being newly planned. These aspects may be inferred from the archaeology, although the difficulty of identifying different building phases, particularly in mound settlements is paramount (Spencer 1993, 49). The presence of different status groups is also a factor which may be inferred from parallel archaeological sources.
- Family constraints and individual choice are factors that are difficult to infer from the archaeological record and, like tradition, can benefit from ethnoarchaeological research.

4.2. Materials and features

4.2.1. Introduction

In the previous section, the contextual factors have been examined and the generic ways in which they might have influenced ancient Egyptian mudbrick houses have been identified.

The study of the modern houses provided a means of classification for the description and analysis of architectural features, as well as supplying theoretical concepts for their interpretation; following the methodology used for the study of the modern mudbrick houses, this section will analyse materials and architectural features and explore the connections of each feature with the various contextual levels. The links between the contextual and material factors observed in modern houses will be explored in the archaeological material.

For that purpose, the same classification used in chapter 3 will be applied to the individual analysis of houses (see Fig. 3.2).

4.2.2. Comparative analysis

Tables 4.1 to 4.11 show summaries of the material found in each individual house within the sample, organised by feature. A full description of materials and features by site can be found in the Appendix (Document 11). Based on those descriptions, this section will attempt a comparative analysis of features between sites, taking into account the information about material and features obtained from the study of the modern houses.

4.2.2.1. External finishes

4.2.2.1.1. Roofs (table 4.1)

All surveyed modern house roofs were flat, with the occurrence of vaulted roofs being confined to an area further south than that studied for this research. The main types of roofs found in modern mudbrick houses, as explained in chapter 3, were a light roof, made of piled branches and grass, and a sturdy roof made of a combination of matted reeds and beams, usually plastered. The evidence from the archaeological record, in the form of pieces of mud plaster, sometimes smeared with a layer of mud, with imprints of either beams or matted reeds and/or fragments of beams in some cases, points only to the presence of sturdy roofs. Examples of these can be found in Tell el-Daba (Middle Kingdom), Deir el-Ballas (where mudbricks with reed impressions were also found) and Amarna, although it is sometimes difficult to distinguish roof mud pieces from wall fragments. However, this evidence can be misleading given that, due to the organic nature of roofing materials, light roofs could have been largely lost or not recognised in the archaeological record. Consequently, an absence of this type of evidence points not necessarily to an absence of roof all together, but also potentially to a light roof. In some cases however, as is the case in Elephantine, evidence for a light roof can come from a large quantity of vegetal material being preserved in the strata of a room; if particular attention is not paid to the recording of these organic remains, the room might be wrongly assumed to be a courtyard. However, in many cases, interference with deposits of different provenance or the action of the elements could hinder this evidence.

In terms of the area, climatic conditions can affect the need for a roof, so the possibility that dry, warm conditions might exclude the need for a roof in certain rooms and certain geographical areas must be taken into account. From the remains preserved, there does not appear to be any correlation between geographical areas and the preservation and type of roofs. It may be worth noting though that two of the sites which shared topographical and environmental conditions, Amarna and Deir el-Ballas (desert edge), both have preserved sturdy roofs. The other sturdy roof preserved is in the Delta (Tell el-Daba), while possible evidence of a light roof has only been preserved at Elephantine.

Chronologically, the evidence concentrates on the Middle Kingdom, Second Intermediate Period and New Kingdom, but not all sites within these periods have preserved evidence. It should be mentioned that in some of these sites this evidence may not have been recorded; in the case of Lisht, it is assumed that some roofs, both light and sturdy, would have existed (Arnold 1996, 19), however the evidence is not clear; in the case of Kahun, it is possible that the fragments of mud were discarded with the rubble.

Consequently, it is particularly difficult to discern the reasons behind the absence or presence of a roof and the specific type of roof, given the unevenness of the data available and the fact that this is the feature which is most subject to destruction through weathering and erosion and the first one to disappear.

4.2.2.1.2. Walls (table 4.2)

It is important to point out that when describing walls, some reports do not differentiate clearly between external and internal walls; nevertheless, this distinction seems highly relevant for an analysis of domestic architecture, as the thickness of the external walls can provide information on insulation, structure – for example, the potential presence of upper storeys- and security.

The thickness of the external walls was only available for Tell El-Daba (SIP), Amarna and el- Ashmunein and varied from half a brick (Amarna) to two and a half bricks (el-Ashmunein). Most of the walls in Tell El-Daba (SIP) had a thickness of one and a half bricks.

The size of the bricks at Tell el-Daba (both periods), Amarna and el-Ashmunein was similar overall, the main difference being that Tell el-Daba (SIP) bricks were considerably longer. The consistency of the bricks was more compact and loamy in Tell el-Daba (SIP) and Elephantine, where they also contained sherds, charcoal and a high proportion of organic tempering, while in Kahun and el-Ashmunein the bricks were sandier. This would be reflecting the differences in geographical position and consequent access to brick making resources.

Evidence for brick bonding came from Tell el-Daba (SIP) and El-Ashmunein. At the former, the bonds were regular stretchers with a mixture of brick-on-edge courses, while at the latter, the bonds were headers and stretchers. Consequently, there is no substantial amount of evidence to establish conclusions regarding bonding. This is in contrast with the comprehensive brick bond typology by Spencer (1979). Brick denudation hinders the identification of this bonding in some cases and it is possible that the absence of details in the archaeological reports responds to this erosion; on the other hand, the lack of accuracy in the recording of bricks could be an issue and it must be assumed that an active use of bond typologies in the field could improve recording at least in some cases. There is evidence of walls being plastered in Giza, Kahun, Elephantine (older walls) and Amarna. In all cases, this was a mud coating, more or less rich in straw, with the exception of Kahun, where there was evidence of ground up bricks being used as plaster. Plaster was painted at Kahun, Amarna and Elephantine, in all instances with a white colour.

The only site that mentioned external wall reinforcement was Elephantine, where wooden posts and stone slabs were found protecting corners, which faced a street.

4.2.2.1.3. Doors (table 4.3)

In modern houses, limestone thresholds were not recorded; however, the front doors of Elephantine, Tell el-Daba (Middle Kingdom, referred to as MK onwards), Memphis and Amarna all have limestone thresholds with pivot sockets, although at Elephantine the presence of a pivot socket within the threshold is not specified. The function of the threshold was not only to protect an area of much activity or to help level the floor but also to provide a steady support for the pivoting pole which would have supported a door.

The three sites where stone door frames (including lintels and sides) are mentioned correspond to houses of a higher status, Kahun (only described for the large mansions), Memphis and Karnak (with an inscription mentioning a priest) and Amarna.

Interior buttresses supporting the door were only found at Amarna. These are not necessary for the door to function correctly but they act as reinforcement especially if the door is rather large and heavy. Another feature exclusive to Amarna was an outside flight of steps with ramps at either side of the doorway.

There is evidence for the bricking up of front doors in Giza and Tell el-Daba (both periods). The creation of new entrances would respond to alterations in the internal house distribution caused by house extensions or sub-divisions, or mere internal room changes which encourage a change in access. The bricking up of doors can also respond to houses being abandoned.

4.2.2.1.4. Windows (table 4.4)

No examples of external windows have been preserved in the sample. Given that some of the walls have been preserved to substantial height, it is to be expected that external windows would have been rather high on the ground floor or that there were no windows on the ground floor and these were only located in upper storeys. Despite the caveats made in chapter 1 regarding the reliability of house artistic depictions, this fits well with some of the representations of houses in Theban tombs, such as tomb 90 (Fig. 4.48 a) where the windows in the ground floor would have been high up – although the drawing can also be interpreted as a two-storey structure with no windows on the ground floor (Spence 2005, 140). On the other hand, the house representation in Theban tomb 254 (Fig. 4.48 b) presumably shows what would be a two-storey house, potentially with clerestory windows on the ground floor (Spence 2005, 140). During fieldwork in modern houses, it was observed that in many two-storey houses, the sources of natural light for the ground floor are the stairwell and the main door which is kept open, therefore, the lack of windows in the ground floor does not pose an environmental problem. Nevertheless, not all tomb representations fit this description; in the case of tomb 23 (Fig. 4.48 c) it would appear that large windows are present in both ground and upper floors. The reason for this variability is uncertain. In any case, these representations only portray houses of high-ranking officials; consequently, it is difficult to establish whether large windows would be a characteristic of multiple storey houses or are exclusive to houses belonging to this particular class. Unfortunately, these windows have little confirmation in the archaeological record. Aside from the fact that in many cases walls have not been preserved to sufficient height so as to indicate the presence of windows in the upper storey, windows are weak points in the wall; this implies that the surrounding areas are particularly susceptible of collapse; consequently, the possibility that windows might have existed where vertical sections of high walls have collapsed cannot be ruled out.

4.2.2.1.5. Features (table 4.5)

Outside features have not been preserved in most cases, with evidence being reduced to storage bins at Lisht and Tell el-Daba (SIP) and a mastaba and an oven at Amarna. It is possible that this lack of evidence could be responding to archaeological methods, if houses were recorded as individual units delimited by exterior walls, without a consideration of the surroundings.

4.2.2.2. Internal finishes

4.2.2.2.1. Ceilings (table 4.6)

All remains of ceilings indicate flat roofs with the exception of Kahun and Lisht in which two cases of vaulted ceilings were found.

The modern houses showed different arrangements for the ceilings, including variations of beams and matted reeds. The archaeological evidence from ceilings consists of wooden beams with incisions that can be found in Kahun and in Deir el-Ballas, where there are acacia beams, which appear to be semicircular and are covered with a marl mortar. This corresponds well with the remains of mud coming from roofs which show imprints of matted reeds, impressions of string (which would have been used to tie the mats together in the way that grass is used today) and impressions of beams. Most of the evidence comes from Amarna, where fragments of painted mud plaster have been found which have marks of narrow wooden poles and grass bundle impressions. The remains of painted, mainly white and pink-brown, mud plaster correspond to the techniques used nowadays where the matted reeds, and also sometimes the beams, are covered in mud plaster and painted. Some of these fragments have rounded impressions which suggest that the beams would have been painted too.

It is important to note that, when not analysing fragments coming from areas in contact with reeds or beams, it can be difficult to distinguish between fragments belonging to a ceiling or to a wall as both can be plastered and painted. In addition, wooden beams are occasionally present in certain walls, a feature also seen in modern houses, therefore their identification as roof beams might not always be certain.

4.2.2.2.2. Walls (table 4.7)

Wall thickness was recorded in Elephantine, Tell el-Daba (SIP), Amarna and el-Ashmunein. Thickness varied between half a brick and two bricks, but was not uniform throughout in Amarna. This means that in those examples, the thickness of the interior walls was almost identical to that of the external walls.

Similar to the external walls, the size of bricks recorded did not differ substantially between sites, apart from bricks in Tell el-Daba (SIP) which were slightly larger.

Evidence of mud plaster was described for Giza, Kahun, Elephantine, Tell el-Daba (MK), Lisht, Amarna, Karnak and el-Ashmunein. While this evidence suggested extensive plastering at least of certain walls, in Elephantine the plaster was reduced to a yellow rectangle in H12, probably connected to a small altar which would have been attached to the wall (Von Pilgrim 1996, 45). However in Tell el-Daba (MK), only one example of plaster was found in the whole grid, which was made of ground bricks and sand. In all those cases except for Tell El-Daba (MK) and el-Ashmunein the plaster was also painted, using various colours and decorations in different degrees of complexity. Evidence for repainting of wall plaster exists in Ranefer's house in Amarna (phase II), being difficult to ascertain whether this would respond to maintenance or preference changes, in particular due to the apparent change of owners between phases I and II.

This suggests that plastering and painting are not a matter of status but that they are used to protect the walls in a way similar to nowadays; however, differences in social status could be indicated by the complexity of the patterns and designs.

One exceptional feature was found in one house in Elephantine, whose walls were covered with red granite slabs; this could be a local idiosyncrasy because of the local availability of granite, in a similar way as was seen with the use of pots in walls in modern Naqada (see Chapter 3). The corners of those same walls were plastered, giving them a round appearance.

Some of the walls in various sites were built with bricks of various colours and consistencies, which would point at repairs; however, in the case of Elephantine H86b, several walls showed a different colour to others across, suggesting two different building phases (Von Pilgrim 1996, 77). In Kahun, wooden clamps appear to have been used for securing stonework to the walls, but this feature was only recorded there.

Pilasters forming niches were found in Giza and Amarna and a niche into the wall was also found in Memphis. Karnak and Amarna showed evidence for brick shelf supports.

The only remains of extended blackened interior walls were found in Tell el Daba (MK).

4.2.2.2.3. Doors (table 4.8)

The main difference between external and internal doors across the sample is that, although limestone thresholds with pivot sockets are also present, separate pivot blocks were found in Kahun, Elephantine, Tell el-Daba (both periods), Amarna and el-Ashmunein.

The lack of a pivot socket could be due to it not having been preserved or indicate the original absence of a door; in that case, the doorway could have been covered by different means, for example, there is a possibility that it could be covered with a piece of textile or other material, although no evidence occurs in this sample.

In the workers houses at Kahun and in one case in Elephantine (room D, H12) wooden thresholds – with pivot sockets - also appear, but they seem to have been rarer and would have not performed their function as fittingly as stone, as wood would wear considerably faster with the friction caused by the pole holding the door; this could be an indication of poverty, in that the owners were not able to afford a limestone threshold, or perhaps the doorway in question was not used as much and therefore a wooden threshold provided sufficient support. Brick thresholds were found in Elephantine and Amarna, both of them associated to a change in room levels, a feature which was not recorded in modern houses.

The evidence for jambs is scarce, most likely due to the fact that they were made of wood. However, limestone door jambs were found in Memphis and Amarna and there were indications of timber jambs in Elephantine.

It appears that the bricking up of doorways would have been a common practice not only for external doors – as previously described - but also for internal ones, as evidenced in Giza, Tell el-Daba (MK), Deir el-Ballas, Karnak and el-Ashmunein. This reflects the flexibility of the material, with the bricking up of doors responding to needs, whether modifications in the composition of the household or seasonal changes in the use of space.

A peculiar feature seen in Kahun is the presence of stone chips separating the stones of arched doorways, as previously described. It appears that most of the population in the settlement were stonemasons (David 1996, 167-8). Therefore, it could be possible that the presence of these chips was indicative of the facility to work the stone, rather than a widespread feature, as no examples have been found in other sites.

Other exceptional features found in Kahun were single and double wooden bolts, with the same mechanisms as those found in outside doors in Egypt nowadays and described in chapter 3.

Stone lintels in interior doors only appear in Lisht, Amarna (although only in the house of Ranefer) and Karnak.

Evidence of cavetto cornices only appears in the house of Ranefer at Amarna.

4.2.2.2.4. Windows (table 4.9)

The only evidence for a possible window comes from Lisht where a small opening was found in the lower portion of a vault. The excavators suggested that at about 3 m high, there were slanting windows, although they do not give details; a window at normal height with a wooden bar was also found in a dividing wall, as it is similarly found in Egyptian mudbrick houses nowadays.

It is likely that internal windows would have been more widespread; however, this would also be influenced by the need to provide light and ventilation, depending, first of all, on whether the room had a roof or not, and also on the nearness of other sources of light and ventilation such as courtyards, stairwells or front doors.

4.2.2.2.5. Others (table 4.10)

4.2.2.2.5.1. Floors *(table 4.10)*

Built-up floors are an uncommon feature in modern mudbrick houses. The ground is usually irregular and left unworked although some examples of tiled floors were found in wealthier houses, or covering public areas of the house.

In contrast, floors are largely common in the archaeological record and were preserved in all sites researched with the exception of Tell el-Daba (SIP). Two types can be distinguished, clay floors and brick-paved floors. Clay floors were found in Kahun. Brick-paved floors were found in Elephantine and Memphis. In the case of Karnak, a stone-paved floor was found.

In Tell el-Daba (MK), Elephantine, Lisht, Amarna and el-Ashmunein both types were found. The house of Ranefer specifically was floored by means of mud plaster over mudbricks while Lisht and el-Ashmunein offer evidence for whitewashed floors.

Given that several houses have both types of floors, it would appear that the distinction between them is related to the use of the room rather than to status, as most of the houses in the sample have brick floors, at least, in certain areas. The distinction according to use could be related to two aspects: the practical need for a hard-wearing surface and the special attention given to rooms which might be visible from outside the house or accessible to visitors.

Hard-wearing floors would be needed in areas of high traffic, as would be the case of the brick-paved area around the entrance to the deep hall in Amarna’s P47.6, which gave access to most other rooms in the house, and hallways, such as those in N59.14. They might also be convenient in storage areas and areas, which required frequent cleaning, for example the kitchen/storage area at house III in Karnak. The presence of brick floors in yards, for example in Memphis - always assuming the correct interpretation of the space as a yard- might be explained by the need to protect the space from the elements.

Secondly, brick floors in entrance rooms and halls would be another sign of the better-quality features that generally characterise the public areas of the house; this is particularly visible in the Amarna houses.

The presence of abundant archaeological data regarding floors, in contrast with the small amount of data from modern houses, could be explained by the accumulation of deposits created throughout the years in modern houses, deposits which would normally be excavated in an archaeological context.

4.2.2.2.5.2. Columns *(table 4.10)*

Columns are present in Kahun, Elephantine (although only in certain houses), Deir el-Ballas, Amarna and Karnak. It is interesting to examine to what extent the role of columns is practical; for example, comparing two rooms in two different houses at Elephantine (H86, included in the sample, and H70), both of them with identical size, it can be observed that one room has a column while the other one does not (Von Pilgrim 1996, 215). Therefore, it is obvious that the columns and certainly the number of columns do not have a structural purpose as there is no evidence for a second storey above that room; this points at a status motivation for the presence of columns at least in certain rooms. In addition, examining the sites with columns it can be observed that, in Elephantine, as well as in Kahun, they only appear in the largest houses; they also feature in Deir el-Ballas and Amarna which are likely to be upper class houses, as well as in Karnak which was inhabited by priests.

For this data collection only the remains of bases have been taken as an indication of the presence of columns and not just mere cavities as these could correspond to other things such as marks of half-buried pots or, as seen in modern houses, cavities that are dug in the floor in which to pour water and keep the temperature of the room down, amongst other uses.

4.2.2.2.5.3. Staircases *(table 4.10)*

Remains of staircases were preserved in Kahun, Deir el-Ballas, Elephantine and Amarna, and potential evidence was also found in Lisht. In Kahun, the staircases in the western houses were on the outside of the house, while in the mansions there were none apart from some against encircling walls whose function seem to have been to reach the granaries. While in Elephantine only a few houses had them (none of them belonging to this sample), in Amarna most houses in the sample did; the steps were usually built with bricks on edge and logs. In most cases, only the few first steps remained.

Given that the locations of stairs affect the access to upper storeys/roof and to other parts of the house, they will be dealt with more extensively in the 'distribution and use of space' section of this chapter.

4.2.2.2.5.4. Ovens *(table 4.10)*

Remains of ovens appear in Giza, Elephantine, Tell el-Daba (MK), Memphis and Amarna, Karnak and el-Ashmunein. Most of them are rounded, made of clay and lined with bricks, and can be surrounded by bricks/stones at their bases. The recurrence of this feature indicates its importance across periods, areas and sites of different character.

4.2.2.2.5.5. Mud benches (mastabas) *(table 4.10)*

Mastabas occur in many instances in Amarna inside the house (on one occasion, also outside, as pointed out in the 'features' sub-section). Most of the evidence regarding the function of these structures is not conclusive; both internal and external mastabas could have been used as seats in the same manner as the mastabas outside modern houses.

4.2.2.2.5.6. Storage *(table 4.11)*

There were some examples of storage units outside houses, including a bin full of grain in Lisht; however all sites had examples of storage, most of it related to grain storage, highlighting the importance of this feature in these houses across periods, areas and settlements with different functions. Storage units could take the form of independent bins and silos (Giza, Kahun, Elephantine, Tell el-Daba (MK), Lisht, Memphis, Amarna, Karnak, el-Ashmunein), large containers placed against the wall (Deir el Ballas, Elephantine, el-Ashmunein) or underground (Elephantine, Tell el-Daba (SIP), Amarna). There were also a number of pits in el-Ashmunein; however this seemed to be used for disposal as opposed to storage. Storage could also be located below a staircase (Elephantine, Karnak).

A recurrent feature in Elephantine, Tell el-Daba (both periods), Amarna, Karnak and el-Ashmunein is the presence of partially buried pots, whose existence is mostly inferred from the recurrence of circular pits, sometimes with remains or complete pieces of pottery inside. These have been interpreted as water vessels in most cases. These pits could be mistaken for column base marks or have other functions, such as a space that can be filled up with water to cool down the room, an occasional feature recorded in modern mudbrick houses. In addition they could also be fire pits, which would be indicated by the presence of ash. Possible fire pits have been found in Giza, Kahun, Amarna and Tell el-Daba SIP and el-Ashmunein.

In some cases, it is possible that these structures would have been troughs or mangers for animals as opposed to being used for storage, as suggested by the similarities between these two types of structures in modern houses (see 'mud containers' section of Chapter 3).

4.2.3. Discussion

The survival of architectural features in different settlements is affected by the surrounding environmental conditions, which affect the likelihood of their preservation. The number of archaeological sites available for excavation in the Delta is limited because of their current position under the watertable; they were also originally more susceptible to the effects of flooding, which would have caused the destruction of many houses. In general, it can be said that low-desert towns have a considerably better chance of surviving than those located in the floodplain. However, most houses were actually located in the latter. For example, Kahun lies on the border of the low desert and the cultivated fields, which is most likely the reason why many exceptional features have been preserved, such as door bolts, that have not been found elsewhere. On the other hand, the complex stratigraphy of Tell el-Daba, located in the Delta floodplain, might explain the disparity between the importance of its role in the Second Intermediate Period and the relatively small amount of detail of architectural features that has been preserved.

Beyond the consideration of these factors, the presence of certain architectural features can respond to a number of different contextual factors.

Environmental conditions would have brought about a necessity for certain architectural features, such as raised front door thresholds to accommodate the difference in level between the houses' internal floor and the street, as seen in Tell el-Daba (MK), which would have responded to the need for protecting the houses from the flood.

With the exception of these examples, there are no major differences in features across sites which are likely to have been environmentally related. However, it is worth considering that in the modern sample, a feature affected by the differences in climate was the roof; unfortunately, as has been explained, roofs are the least preserved features in the archaeological record. In addition, a consequence of the lack of preservation of the roofs is that the number of floors in the house is difficult to ascertain, another characteristic which appeared to be climate-related in the modern sample.

Consequently, the impact of environmental conditions on architectural features is difficult to establish from the archaeological evidence available. Nevertheless, the features likely to have been affected are entrance doors, floors, roofs and the mud rendering of walls. The first two are linked to flooding, while the second two would be related to precipitation levels. Main façades and entrance doors could have also been modified to avoid large amounts of dust entering the house. Environmental conditions have a more obvious impact in the distribution and use of space, as will be seen in the corresponding section of this chapter.

From a cultural point of view, certain features such as mastabas (restricted to Tell el-Daba and Amarna in the Second Intermediate Period and New Kingdom, respectively) and alcoves (which might suggest the presence of a bed) reflect the need for a dedicated place in which to sleep or sit with guests or members of the family. However, as their presence is very limited, they might be responding to temporary trends or be a marker of social status.

Cultural characteristics would be mostly appreciated in the particular shape and decoration of architectural features. For example, the capitals of columns or the painted motifs on the walls embed themselves into the culture, as is well known from textual and other types of evidence. Other characteristics, such as the cultural meaning of the use of certain colours, would have been motivated not only by cognitive but also by social factors, and thus would have evolved through time (Baines 1985, 290, 292). The evidence for colour in walls concentrated on Kahun, Lisht and Amarna. The dado on the walls of Kahun and Lisht, both Middle Kingdom sites, has similar colours and pattern, while the colours and designs in Amarna are different. However, given the lack of further information, it is not possible to provide evidence regarding the evolution in colour use throughout time, not to mention changes in the meaning of colour use.

Indeed, the social factor is likely to be of paramount importance in the understanding of ancient Egyptian domestic architecture. It would appear from the analysis of the data that variation in the presence of architectural features is not so closely related to periods or areas, but rather to the apparent status of the house inhabitants as well as the economic activities carried out by them. This does not necessarily suggest a purely materialistic view of the domestic sphere, in which there is a direct correlation between the quality of the features and the status of the owners, but rather the presence of certain superfluous features aimed at communicating a clear set of symbolic messages regarding a person's social position within the community.

For example, the presence of stone is not indicative of status, as most houses across periods, areas and settlements with different functions have limestone thresholds; in fact, none of the houses attributed to presumably humble owners (i.e. workmen) appear to be missing essential features, which they share with the so-called mansions and villas. However, lintels inscribed with the owner's name are only present in priests' or officials' houses, a feature which is not necessary from a structural point of view. In a similar way, lavish decoration might be indicative of a higher status; nevertheless, the lack of such decoration does not have any structural consequence and does therefore not affect the standard of living.

This would suggest that the differences observed in the architectural features might be portraying a spatiotemporal distinction of the role of the owner within the community; that is to say, the house and certain features (e.g. columns, inscribed lintels) would have been used by certain sectors (i.e. upper classes) of society as another vehicle to assert their position in society in general, and within the particular classes represented in that community specifically. Superfluous columns could also be expressing a need of the upper class to be identified, not just conceptually, but visually with palace and temple structures by employing key recognisable features of them. Cavetto cornices could have served a similar function, but the evidence for them is very limited in this sample and restricted to Amarna.

Finally, it is worth considering that mud is fundamentally a flexible material; however, the degree of fulfillment of the possibilities offered by this material may vary in relation to priorities. Practicalities would encourage dynamism and changes; however, some cultural priorities, for example, a desire to cause a social impression or to transmit status might mean that practicality may be sacrificed.

4.3. Distribution and use of space

4.3.1. Introduction

As explained in the 'previous interpretations' section of Chapter 2, the study of space distribution within ancient Egyptian houses has largely been used towards the identification of patterns, which resulted in a formal classification of houses. In addition, the study of the use of space has focused on the attribution of particular functions to rooms; consequently, the discourse regarding ancient Egyptian domestic architecture across sites, both contemporary and from different periods, has been built upon a classification and comparison based on these two complementary working approaches.

In contrast, this chapter aims to provide an interpretation which does not exclusively focus on formal aspects of shape and size in order to construct a picture of domestic architecture, but rather puts them into perspective by considering house space as the expression of a series of contextual factors, from general to particular, which have an imprint on that space.

With that purpose, the possible influence of the contextual factors previously identified in Chapter 3 on the house's spatial distribution will be analysed. With regards the use of space, the areas identified as a result of the analysis of modern mudbrick houses will be used to classify the ancient data and the theoretical concepts developed to interpret it. The aims are first, to test whether a more nuanced view of the house can be obtained from the use of such classification; secondly, to suggest ways in which archaeologists can record data in a manner which will offer a more holistic and flexible explanation of domestic space.

4.3.2. Spatial distribution in ancient Egyptian houses

4.3.2.1. Towards a comprehensive interpretation of spatial distribution

The analysis and interpretation of spatial distribution aimed to avoid the three commonplaces of previous interpretations explained in section 2.1.1.2., namely the overwhelming weight of Kahun and Amarna data, the broad definition of the tripartite and courtyard house and the inclination to search for formal patterns.

In order to do so, the overwhelming weight of Kahun and Amarna data has been avoided by using a sample which included a wide range of settlements of different chronological, geographical and typological characteristics. In order to avoid the constraints of terminology, the analysis concentrated on size and shape without previous assumptions regarding house typology. The analysis was, therefore, not guided by the search for formal patterns, but by the desire to examine the material in relation to the contextual factors previously identified during the research.

For the study of the size and shape of the proposed sample, the net room and total areas of all properties were calculated (see table 4.12 for a summary of net house areas and tables 4.13 to 4.24 for detailed house areas by settlement). Most of the archaeological reports used for data analysis do not actually mention total house areas, let alone individual room areas, only occasionally because of the impossibility of establishing such divisions. There are partial references to certain room areas in some cases, when attempting to show a certain peculiarity. When areas are mentioned, these refer to gross areas, that is to say, including walls. However, as the purpose of this part of the investigation is to evaluate the amount of internal usable space available, net areas have been used, therefore excluding wall areas.

Although the number of house areas analysed is listed at 46, it is important to note that, in houses belonging to planned settlements with a large number of houses of approximately identical dimensions, such as ranks A and B at Kahun and Tell el-Daba (F/I), only one prototype house of each group has been included within the table. It is also worth noting that some of the net areas are expressed as 'minimum' given that the full extent of the room is unknown.

The house net areas have been divided into the following categories to facilitate comparison: less than $50m^2$, $50\text{-}100m^2$, $100\text{-}200m^2$ and over $200m^2$ (Table 4.25). Overall, a significant difference cannot be appreciated within the sample in the total number of houses across sites belonging to each group, although the larger the house area is, the less amount of houses there are in the sample (with the exception of the over $200m^2$ houses, however 7 out of those 10 houses belong to only one site, Amarna's Main City).

The largest number of houses overall are those of less than $50m^2$. In particular, in Tell el-Daba, both in the Middle Kingdom and Second Intermediate Period, only houses of those dimensions have been recorded; similarly, the vast majority of houses in Memphis have an area of less than $50m^2$ (although it is worth pointing out that the space between different houses is not clearly delimited, which on the other hand is likely to portray the reality of some residential areas). The problem in delimiting space is also present at el-Ashmunein; in j11-k11 level 1c, not enough walls were clearly identified as belonging to a house; equally, the space delimited by walls in k10 level 1b, which account for at least $34m^2$, has not been included as part of j10 -as Spencer (1993) did not assign room numbers to this area- so that the total space might actually be larger (c.$75m^2$).

In addition, as mentioned, because some houses are taken as representative of a large number, the actual number of houses of less than $50m^2$ in the sites mentioned is substantially larger.

Elephantine is the site with the most houses in the $50\text{-}100m^2$ and $100\text{-}200m^2$ groups. In the case of Karnak, houses exclusively belong within those two groups.

Settlement areas are also shown in table 4.25. It is important to point out that, in some cases, the full extent of the settlement has not been determined (e.g. Memphis, Tell el Daba F/I), therefore figures represent the known settlement area only, as estimated from published site maps. In addition, the impossibility to build on top of certain features – such as water basins, channels and flood areas (Bietak 2010b, 12) – might also practically have reduced the building areas available within the settlement. In spite of that, the correlation between settlement areas and house sizes has been explored with the aim of investigating the potential of it being a relevant factor.

Only three sites have houses which are over 200m^2, Kahun, Amarna and Deir el-Ballas. The first two settlements are also those with the largest site areas within the sample. The exception is Deir el-Ballas, whose residential zone area has not been determined, but whose total site area is only 1.2km^2. The rest of the settlements, with estimated areas between 0.0005 and 0.6 km^2, do not show an apparent difference in the number of houses across categories, with 100-200m^2 houses always being less in number than 50-100m^2 across all settlements. However, in several of them – Elephantine, Karnak, Giza – the number of houses in the 50-100m^2 was higher than in the less than 50m^2 category.

In conclusion, there does not appear to be a correlation between the residential settlement area and the size of houses except for the extremes, represented by Tell el Daba in which there is the largest number of less than 50m^2 houses, and Kahun and Amarna where there is the largest number of over 100-200m^2. No further conclusions can be established given the impossibility to know in many cases the full extent of those settlements. However, the only correlation made indicates the relevance of investigating this factor, provided that more accurate data regarding settlement area is available.

4.3.2.1.1. Chronological considerations

From 'Previous interpretations' (Chapter 2), it can be said that the chronological development of house plans across history originally proposed by Ricke, had already been discredited on the basis of the evidence from sites other than Kahun and Amarna, such as Elephantine, which demonstrate the co-existence of various tripartite models as well as of these and the central hall/courtyard house (Von Pilgrim 1996).

The floor plans of the houses included in the sample can be found in Figs. 4.19 to 4.46. Aside from the previous considerations that have been made regarding the reliability of classifying houses in tripartite and courtyard plans, the analysis of the sample supports the rejection of a chronological evolution, as a variety of plans from the Old Kingdom to the Third Intermediate Period show no further complexity or a clear evolution of the earlier into the later ones. For example, the floor plan of house A 1.3 from Lisht in the late Middle Kingdom (Fig. 4.20), appears to share more in common in layout with that of house E in Old Kingdom Giza (Fig. 4.19 top right) than with the contemporary house plans of Kahun or Elephantine (Figs. 4.22 to 4.29).

As far as the continuity between the Kahun mansions and the Amarna standard villas is concerned, their possible chronological evolution should only be considered within their probable adscription to a same social group and not as representative of domestic architecture evolution as such, given the exceptionality of some of the characteristics previously mentioned. Support for this resides in the fact that contemporary Amarna houses outside the Main City, such as in the planned settlement of the Workmen's Village, share no direct plan similarities with those in the Main City. In fact, Ricke did not try to classify these other houses, but limited his typology to the Main City.

4.3.2.1.2. Environmental considerations

Within the consideration of the environment surrounding the sites, the potential effect of three factors in the size, design and appearance can be evaluated: the general geography of the area, the morphology of the site and the climate. While the latter has been more broadly studied, the first two have only recently started to be actively considered in the interpretation of domestic architecture (see Lutley and Bunbury 2008, Bunbury *et al* 2008, Jeffreys 2008 in the 'Historical Environmental Conditions' section in this chapter, as well as the individual environmental conditions sections of Giza, Karnak and Memphis described above).

In addition to the general factors of environmental context (see 'Contextual background' and 'Contextual factors' sections above), the particular morphology of the site could have had an influence on the site's housing appearance and distribution. For example, the availability of land at Amarna has been frequently pointed out as a possible explanation for the presence of extended houses with large courtyards and ancillary facilities (Fairman 1949, 42). Conversely, small available areas, such as in the causeway of Khentkawes town, limit the house size – although this does not prevent modifications in order to try and counteract those limitations.

Badawy (1958), above all, used parallels with modern Egyptian and Near Eastern architecture to analyse the influence of climate in the orientation, design and features of the ancient Egyptian house. The need to cool the house was a particular element of discussion, materialised in the orientation of the house towards the north and the use of *malqaf* with the intention of receiving cool winds. *Malqaf* were depicted on the walls of Theban tombs (Badawy 1958, 122). These were brick-vaulted or wickerwork wind scoops, which faced north and were angled downwards, to capture the wind and channel it into the rooms (Davies 1929, 246). They were placed on the terrace, having a triangular aspect in side view, as could be seen in representations at the Amarna palaces (Badawy 1958, 122). Similarly concerned with climate was Endruweit (1994) who concluded that the desert climate had an essential role in defining the distribution and appearance of Amarna's Main City houses, determining their orientation, layout and features.

These considerations refer generically to the provision for a hot climate which would have been a factor in settlements across Egypt; however, it seems necessary to evaluate whether the topographical location of the sites has a correlation with the design and appearance of the individual houses, including their extended or dense distribution.

In the sample, the sites have been classed as being located on the plain (whether desert or floodplain), on mounds and on plateaux (table 4.26), as these topographic locations naturally allow different degrees of expansion to the settlement.

The only three sites where there are houses of over $200m^2$ – Deir el-Ballas, Kahun and Amarna- are located on the desert plain. Kahun and Amarna are also the largest settlement areas. This is not necessarily the case of Deir el-Ballas where, although the residential zone area is unknown, it could not be in any case extraordinarily large given that the total site's area is only 1.2 km^2.

In all sites located on mounds, the most numerous houses are those of less than $50m^2$. On the other hand, most of the houses of the three sites located on plateaux fall within the two middle categories, measuring at between 50 and $200m^2$.

Therefore, in terms of a correlation between the size of the house and the location in relation to the flood there appears to be a certain correspondence within the sample between sites on mounds and a larger quantity of smaller houses and between sites on plains and a larger quantity of larger houses, while the size of houses on plateaux are average. Nevertheless, this does not mean that <50m^2 houses and particularly 50-200m^2 houses are not found in larger sites, and this could be due to social reasons which will be further analysed.

In respect to the residential fabric, the investigation of the modern data revealed that the differences in extended and tight spatial arrangements could be due to climate, location and the need to escape from the flood, but ultimately also to do with economic reasons, as richer owners built more extended properties. In addition to these factors, the area of the site must also be taken into account. Furthermore, there is a correlation between dense urban fabric and mound location in the sample; in the case of the Middle Kingdom settlement at Tell el-Daba, this could be justified in its planned origins; in el-Ashmunein it is difficult to know for certain but the houses appear to be tightly arranged, as they are in Memphis. It is important to point out though that in both sites at Tell el-Daba and potentially also in el-Ashmunein, these residential areas selected are not the only ones in the site, therefore this correlation might not necessarily be representative. At Memphis, the tight arrangement could be caused by the fact that the settlement shows partial signs of a planned development (Jeffreys 2006, 137) with a main north-south dividing wall.

4.3.2.1.3. Social considerations

Social aspects are analysed in Table 4.27. Where identification of the group in question was solely deduced from material culture, a question mark is shown. Similarly, where no particular remark about social status of the inhabitants was made by the excavators, it is listed as unknown. Where no question mark is shown, identification was positive at least for a certain building stage, suggested from the presence of door lintels naming priests or official titles, for example. In these cases, there is surrounding supporting evidence to suggest that, at least for part of the occupation, the presence of these features was not solely due to re-use. The groups for which this type of evidence exists are priests and high officials. Priest houses appear to fall in the middle two categories, while the high officials' houses all are over $200m^2$ (however, for areas of main houses only, without ancillary facilities, outbuildings and courtyards see table 4.22).

There is great variation in what could be potentially identified as craftsmen's houses, mainly related to Memphis, in which houses are considerably smaller than the rest. This could be due to production of domestic crafts being mistaken for professional activity, or perhaps is to do with the degree of importance within the profession.

Whether the inhabitants of ranks A and B at Kahun were workers or craftsmen is not clear, however their houses are of medium size (it must be noted though that some houses on the western sector and the main town which have not been included in the sample, have an area of $50m^2$ (Quirke 2005, 84)). The inhabitants of the planned settlement at Tell el-Daba, who were classed as workers, lived in extremely small houses compared to the overall sample, only analogous to certain groups of rooms in Memphis which have been identified as belonging to the same house (Jeffreys, 2006), and to el-Ashmunein (but the total area of these has not been established for certain as mentioned before). In addition, the evidence that the houses at Tell el-Daba would have rapidly expanded and turned into larger properties (Czerny, 1999) must also be taken into account.

Lastly, it is important to note that the social status of the inhabitants of a large number of houses in the sample is difficult to establish; in spite of this, the sample seems to show a distinction in general terms between large-sized properties belonging to high ranking officials and middle-sized properties belonging to priests, perhaps also to certain craftsmen. This appears to be in consonance with the observations of Arnold regarding Lisht and Giza (Arnold 1996, 15). Any observations regarding small properties are much more difficult to establish given the lack of a clear relation between the various variables taken into consideration; this is in part due to the uncertainty about the real size of some of the smaller properties in the sample, in part to the difficulty in establishing the social status of the inhabitants of small properties.

4.3.2.1.4. Planned vs organic settlements

No direct correlation has been found between the organic and the planned character of the sites and house sizes across the sample, except for the fact that all houses in the two planned settlements of priestly character – Karnak and Giza – fall within the two medium categories (table 4.28). However the other two planned settlements – Tell el-Daba and Kahun – do not; this could be related to the social considerations already discussed.

Within the organic sites there is obviously a high degree of variability due to their nature; within the planned sites, it is worth noting that, with the exception of Tell el-Daba, all other sites have houses within the two middle categories or in the >200m^2 in the case of Kahun, which indicates, firstly, the degree to what houses are modified after planning, which causes differences in size; secondly, it is a further indication that there is no necessary correlation between planned settlements and small house sizes.

4.3.2.2. Discussion

The purpose of analysing house size in relation to contextual factors was to provide an alternative analysis that tried to avoid three commonplaces of previous interpretations.

The comparative analysis of house plan and size within the sample did not reveal any indication that suggested a chronological development of a certain house plan. Environmentally, there appears to be a correlation within the sample between a mound location and the presence of a larger quantity of smaller houses; conversely, location on the plain appears to be associated with a larger quantity of larger houses in the case of desert plain settlements (in the only floodplain example, Karnak, it is not the case, but the houses do not form part of a settlement as such). Lastly, there are more average sized houses on the plateaux. Nevertheless, this general trend does not exclude the presence of other house sizes. The settlement dimensions must also be taken into account; in this sample, there is no direct correlation between the sizes of the settlement apart from the extremes. More thorough data regarding settlement area would be necessary to establish definite conclusions.

In terms of sociocultural considerations, it is difficult to establish the social status of the inhabitants of certain houses, particularly those of the smallest houses. Nevertheless, the sample appears to show a general correlation between large-sized properties belonging to high ranking officials and middle-sized properties belonging to priests, perhaps also to certain craftsmen.

Lastly, the sample has not shown any particular correlation between the organic and planned characters of the sites and house sizes.

This analysis would suggest that the use of house size as a comparative tool and as an indicator of status must be exercised with caution; a number of factors must be considered first for this information to be of use: the space available within the site overall and the amount of space dedicated to the settlement, the reasons behind the settlement and the social ties established within that particular community. Although some general correlations can be seen between a high social status and the owners of the largest houses, this picture becomes blurred the smaller the house; in addition, the correlations are by no means univocal. Therefore, it would appear that the correlation between house size and status is in any case better understood within the particular circumstances of the community, and that such comparisons are better established within the houses of a particular settlement and bearing in mind the social groups that are likely to be represented within that site. Consequently, it is suggested that, in order to obtain conclusions from house sizes across sites, a relative analysis of the houses available within each individual settlement must be undertaken first; consequently, the comparative analysis would not take place between the absolute house sizes available across sites, but rather between the relative analyses undertaken within each site.

4.3.3. Use of space in ancient Egyptian houses

4.3.3.1. Towards a comprehensive interpretation of space use

In section 3.3.2., three factors were identified as being relevant for the understanding of mudbrick house space: the notion of 'predominant use' as opposed to that of function, the influence of cultural determinants and the consideration of short and long term changes in the use of space.

These concepts have an archaeological application; due to the short and long term alterations of space, which acknowledge the diachronic use of space, the presence of an object cannot be used to justify the function of a room (Kamp 1993, 308). Instead, a focus has been put on identifying the predominant use of space through organic remains and architectural features and the application of the practical observations carried out in modern houses.

Organic remains are not always directly useful in determining the presence of activities, given that activities such as sleeping leave less organic trace. However, their absence might be indicative of the absence of litter proper of sitting rooms, good storage and food storage rooms and sometimes kitchen and courtyards, which are likely to be regularly cleaned; conversely, this refuse is more resilient in rooms with fodder storage and animal keeping.

The practical observation carried out in modern houses also focused on household/family changes and economic factors. These may or may not be physically visible, but the possibility that they influenced the use of certain rooms has been taken into account in the analysis of the ancient data, chiefly through the process of room 'demoting' which implies less detail (Kamp 1993, 309); also it is clear from ethnography that similar activities do not necessarily have a correlation in similar room size, architectural features, position or access (Kamp 1993, 307).

With respect to the influence of cultural determinants, the analysis of modern houses has also prompted the search for similarities in plans which might respond to the standardisation proper of public areas and the flexibility proper of private rooms (Kamp 1993, 300), the distinction between which is established culturally. Another indication of the presence of public areas is usually the presence of better architectural features.

According to the three aspects described, the consideration of the use of space in the archaeological sample will be driven by the following principles: the remains of activities will be used as an indicator of the predominant use given to a certain room, rather than to attribute a specific function to that space; equally, the possible short and long term changes will be taken into account. Lastly, the influence of specific cultural aspects associated to the inhabitants of the house, such as the concept of privacy and the distinction between public and private spaces, which are culturally determined, will also be considered.

4.3.3.2. Identification of predominant use of space

The research therefore seeks to employ the concepts of short and long term use of space, the notion of 'predominant use' and cultural determinants as a basis for the study of the activities undertaken in each house. As explained in chapter 3, a series of repeated activities across houses were identified in the modern rural sample, namely storage, animal keeping, cooking, sleeping and social interaction.

Therefore, the analysis of the distribution and use of space in this sample will concentrate on exploring the indication of the presence of these five activities and the instances in which they take place together, in order to assemble a more dynamic picture of the house which reflects more reliably the reality of the house in ancient Egypt. As Spencer (1996, 223) indicated, '(…) the natural development of mudbrick domestic remains (…) was a continuous process of adaptation and piecemeal renewal' which has the potential to increase the flexibility in the use of space within these houses, while also obscuring the archaeological record due to the successive building phases. The analysis will also aim to explore whether any other factors, such as wealth or status, might affect this degree of dynamism, as the data analysis suggested during the study of architectural features (see Section 4.2.).

4.3.3.2.1. Storage

The identification of storage within the sample refers primarily to food and drink; storage of objects rarely features in the archaeological record of houses given that inhabitants usually take valuables with them when abandoning their house, unless this abandonment was precipitated by another event (Kemp 1995b, 161). Evidence of storage can be found in the sample in the form of underground silos, mud and brick bins, boxes and silos, buried pots (whose presence is often inferred from cavities in the floor left by them) and pottery (see table 4.29). In addition, whole rooms can act as magazines, which in essence have the role of exceptionally large containers.

Underground silos often cut through several stratigraphic levels, making it difficult to establish a definite relation between them and house remains. In addition, smaller silos can sometimes be confused with refuse pits, as these can contain worked products susceptible of being stored or thrown away, such as the alabaster and slate pieces found in a pit in Amarna's O49.14 in an adjoining room (Amarna) (Fig. 4.41, room 2). Most of the underground silos appear in areas identified as courtyards; however, e.g. in Amarna's N51.4 they appear in rooms identified as a bedroom and an anteroom (see Fig. 4.39, rooms 10 and 11). Assuming the identification of these rooms is correct, it is plausible that these silos could have either belonged to a different phase or been used for the storage of valuables other than food. The storage of valuables in bedrooms is indeed documented in the modern sample and responds to the need to protect those objects from possible theft. In all cases, the rooms are away from the main entrance, which would support this function. However, bearing in mind the considerations put forward concerning room use, the possibility that several activities, which may seem mutually exclusive, took place in the same space cannot be ruled out.

Mud and brick bins, boxes and silos were the most abundant option for storage in the sample and were also found mostly in spaces identified as courtyards. Whether or not the term ‘courtyard’ is correctly used, most of these spaces would have been indeed difficult to roof, e.g. Elephantine ‘courtyards’ ranged between 5 and 7m in their narrow sides, which would exceed the distance that can be spanned with the use of beams (Space C in Fig. 4.24 to 4.27, space E in Figs. 4.28 and 4.29). The courtyard in house E at Giza (Fig. 4.19 top right, room 79), on the other hand, only had a width of less than 2m, which would have allowed for it to be roofed.

There is evidence for the presence of buried pots in all periods from the Middle Kingdom (with probable presence at Tell el-Daba and Elephantine), although they do not feature in all sites. Their position can vary and they occur not only in courtyards, but also rooms classed as living rooms, entrance rooms, bedrooms, kitchen/storage rooms and other rooms of unclear function. Particularly in Amarna, buried pots featured simultaneously in various rooms of the house, e.g. rooms 18, 20 and 22 of O47.8 (Fig. 4.35). The employment of buried pots as storage would have had two apparent practical uses, that of keeping the contents of the pot as cool as possible, and the possibility of concealing small contents from public view in a similar manner to the underground silos. The identification of their particular use would be helped by a typology of the pots found within; however, when the presence of pots is only inferred from the depressions left in the floor, the two practical uses of buried pots would suggest their use either as water containers (which could have been used for drinking, washing or damping) or for valuables’ protection. It is tempting to then assign the first function to those found in courtyards and the second one to rooms such as bedrooms. However it is important to note that in many cases the identification of the rooms might not be certain – indeed, many of the examples of buried pots come from the early German excavations at Amarna (1907-1914).

Lastly, if animals were present, these buried pots could also be used as fodder troughs for chaff or straw.

The interpretation of pottery requires a thorough typological analysis to establish which containers are more suitable for storage, food processing, serving or consumption. A common feature found in the archaeological sample was water jars and vessels. Pottery can be found in a number of different rooms in terms of position and alleged function, but two particular locations within the sample are worth highlighting. The first is the presence of pottery in a room or cupboard underneath the stairs; evidence for this was found in room g of house I in Karnak (Fig. 4.43), room 13 of Amarna's P47.6 (Fig. 4.40) and potential evidence in Memphis (Fig. 4.33, room 20 and unnumbered to south of 19); this is still a common place for storage of different kinds in modern days. The other location is in association with furnaces and/or rooms where there is evidence of bread preparation, e.g. in Elephantine's H25a room B (Fig. 4.26). This can be indicating either the simultaneous use of the space for cooking and storage activities, or simply the need for water in the bread making process.

Lastly, storage buildings can be difficult to identify (Mihoko 2002, 104) and this difficulty increases when that role is taken by a whole room within the house. A high concentration of organic particles would aid in the identification of these storage rooms, however they could also change function over time. Sometimes the identification of storage rooms is based on the presence of a series of identically sized rooms, such as in Kahun (NE corner of mansion 1, Fig. 4.22). The presence of rodent bones or dung is a frequent indication of long term storage (Hardin 2004, 75; Rosen 1991, 101). For example in the case of Elephantine in H25a (Fig. 4.26), room B, there were remains of mouse dung, although it was not obvious whether the remains would have been simultaneous to the preparation of bread which appears to have taken place in that room or whether the mice would have been trapped at a later date.

In large compounds such as the Kahun mansions, storage rooms are accessed consecutively through a previous storage room, as they appear to be connected by doorways (Fig. 4.22). They would have been filled from the top with the help of a ladder, as exemplified by contemporary models (Wegner 2001, 290). The examination of a wooden model from the tomb of Meketre (Fig. 4.47) provides an example of two grain storage rooms which in fact are not totally self-contained spaces; instead, the model, in plan, would show two ordinary rooms of full height communicated by a doorway; only its three-dimensional visualization would show that we are dealing with two storage rooms separated by a low wall with an opening linking both sides.

Although the reliability of ancient Egyptian models in general has been brought into question as discussed in chapter 1, the vast majority of wooden models depict features in such detail that it is unlikely that they do not correspond to reality. Aside from the fact that proportions are obviously distorted, human figures are carefully characterised depending on their status/role, down to the detail of their clothes. Despite the fact that they make use of conventions to portray certain architectural characteristics, such as raised corners for courtyard walls (Roik 1988, 38), these models portray door features and painted areas for which counterparts have been found in the archaeological record, increasing their reliability.

In this case, the examination of this model, despite not being a residential unit, has been brought into the discussion to show the relevance of considering the three-dimensional character of the house, the importance of which was first highlighted by Kemp (1995b) and later by Spence (2004).

With regards to the roles and compatibility of the types of storage described above, this particular research sample shows a peculiarity; in the vast majority of houses where there are silos and bins, there are no buried pots and vice versa. Only house 6 in Tell el-Daba (MK) (not certain) and Ranefer's house (phase I) had examples of both. In the cases of houses which do not have silos or bins, this could be pointing to two different and opposite causes; one, that there would have been rooms whose main or unique function would have been grain storage, but which are not identifiable anymore; the other one, that the grain provision that the inhabitants of these houses received was organised from outside, the grain being stored elsewhere on site and distributed evenly throughout the year. It is also possible that the grain would have been stored in textile sacks, which have not survived. The absence of silos in these houses would not imply that cereal processing was not carried out within them; the system of grain distribution would have required the facilities to transform it into bread and beer, but would have not necessarily required silos in which to store it, as appears to be the case for the Workmen's Village at Amarna (Kemp 1994, 151). Buried pots would have then been sufficient to cover the amount of storage needed. Conversely, in the cases where there are silos and bins but not pots, the large silos/bins would have sufficed for storage; perhaps there was a room dedicated to keeping the water jars which already provided the cool space needed for this liquid, e.g. small chamber between rooms 26 and 29 in house A in Kenthkawes-Giza (Fig. 4.19 top left). In addition, water jars could have been placed on stands instead of in a depression in the ground; if such stands were made of wood, or grass or straw wrapped up making a ring, they are unlikely to have survived. If they were made of clay, they can be difficult to identify as rims and bases look similar to those of pots. There is also a possibility that silos and bins would have not been recorded in excavation or that they have been destroyed and became part of the organic remains of the house, a possibility increased by the chance that silos could have been rebuilt every year before the harvest as part of the general recycling and maintenance processes of the house.

Nevertheless, there is another factor which should be taken into account and which might affect the possibilities outlined, that is the evidence for upper storeys. The possible presence of extra storage in the first floor cannot be ruled out for those houses in which there is evidence of stairs, bearing in mind that artefacts, hay and so on could have also been stored on the roof surface with the help of an external ladder. In the modern research sample, the storage provision for food in the upper storey appeared to be complementary to that in the ground floor as opposed to substituting it; the presence of storage provision of any kind in the ground floor did not preclude the existence of further storage in the upper floor/roof terrace, which featured mainly in the form of bins and small containers. This implies that, even if there is little or no evidence of storage on the ground floor, which accounts for the vast majority of the house remains preserved, storage could have taken place on the first floor either within rooms or on the roof terrace (or both) or even on the roof itself.

While other activities are more easily understood within the limits of the individual house, the issue of storage is largely intertwined with that of production and distribution within each site, which must be considered in order to be able to interpret storage evidence fully.

4.3.3.2.2. Animal keeping

Traces of animal keeping are more easily identifiable from the presence of dung and manure, although in the case of mudbrick houses care has to be taken as floor and wall deposits, which contain animal dung, might also be responsible for the presence of such remains (Panagiotakopulu *et al* 2010, 480). It is worth distinguishing between large and small animals. The modern sample showed that large animals were kept on the ground floor given the obvious difficulty of placing them on the roof or first floor due to their weight, as well as the convenience of taking them out onto the fields from the ground floor. On the other hand, poultry could freely roam around both the ground and the first floor and chicken coops were often located upstairs. Traces of poultry keeping (ducks, geese and pigeons, since chickens were not bred until the Ptolemaic Period (332 - 30 BC)) may be more easily lost in the archaeological record. The fact that the archaeological record, which preserves mostly ground floors, overwhelmingly shows traces of large animals, such as goat dung, manure or the presence of a tethering stone and has little or no record of poultry, seems to suggest that ancient Egyptian houses might have followed the same animal arrangements as modern ones.

Animal keeping as an activity can have an architectural correlation for example, in the position of access into the house. In modern houses, some relatively wealthy rural houses have two doors opposed in plan, one for people and one for animals. In Elephantine, in H86b (Fig. 4.29), there are two apparent external access openings into the house, one located in the northern corner (room K) and the other in the southern corner (room A). The east access was identified by the excavator as the main access (Von Pilgrim 1996, 77); however, entrance room A has an area separated by a low wall for a goat, and rooms B and C which immediately follow the entrance room and lead towards the courtyard, have abundant remains of goat dung. This would suggest that perhaps this access was in fact the secondary access, used for animals, while people would have used the west access. This interpretation could be supported by the fact that the east wall of B appears to have been reinforced with granite blocks, which could have served to protect the wall after the animal repeatedly butted it or hit it. Coincidentally, the doorway in entrance room A is also wider than that of room K, which would be consistent with its use as an access for animals.

Similarly, in Giza in room 28 of house A (Fig. 4.19 top left) there was a limestone tethering block which could indicate that the room had been used as a stable; the door was bricked at some point but it is not clear whether this was simultaneous to the presence of the stone; therefore the possibility cannot be excluded that at some point the north door would have been used as the main door and the south door, which faces the causeway, was used for animal access, perhaps in connection to the accessibility to the temple provided by the causeway.

The presence of tethering stones could indeed also suggest animal keeping; however, their presence is not always conclusive; in H10, room A (Fig. 4.24) there was a tethering stone related to three different strata, without it being clear to which phase it belonged. In addition, there was a high concentration of vegetal fibres, but only in the upper layer. It is therefore uncertain whether the room served to keep animals at some point (Von Pilgrim 1996, 49); as for the remains of vegetal fibres, they could correspond to animal fodder, the simultaneous use of the room for hay storage or the result of the roof collapse, since the shortest width of the room was 220 cm, which would allow for the possible piling of hay over some beams.

Room **e** of house A 3.3 (Fig. 4.21 bottom) in phases 2-3 of Lisht, was interpreted as a stable and possibly also a kitchen due to the remains of dung and ash there found (Arnold 1996, 19). While it is not impossible that these two functions coexisted simultaneously, the interpretation of a kitchen function is primarily based on the presence of ash; to this, other possible uses of ash should be added, amongst them, its use as insecticide (Miller 1987, 14-16), as pests were a common problem in ancient Egyptian towns (Panagiotakopulu *et al*, 2010).

This room had previously, presumably before a period of abandonment of the house, had a dais or platform, which led to its interpretation as the office or a scribe or priest (Arnold 1996, 19). While this interpretation is not certain, the change in use of the space over time would support the idea of the flexibility in long-term diachronic function; in addition, if the house belonged to the same owner during both phases, contrary to what Arnold (1996, 19) assumed, it would support Kamp's (1993, 309) observations of the 'degradation' of living-type rooms to animal and kitchen areas.

Petrie (1890, 1891) did not specify in his account of Kahun whether any animal remains had been found; however, Ricke (1932) identified the large 59-62 rooms (Fig. 2.3) as stables, while Bietak (1996) and Quirke (2005) coincided in classing them as magazines. Quirke (2005, 63) identified the area as the quarters of the house administrator. The other areas identified as animal areas were rooms 55-58 (Quirke 2005, 67), but the evidence is not specified and the identifications appear to be based on room size or position. On the other hand, no indication was recorded for the presence of animals in the small houses in Kahun although, if the stables and magazines in the mansions were so large, they would have been able to cover the needs of the small houses.

Feeding troughs could be another indication of animal presence, and they appear in several rooms in Amarna (main living room of Q47.23c, yard in O47.8.b and utility room/workshop in O47.8a (Borchardt and Ricke 1980, 164, 79) and the transverse room of N49.18 (Ranefer II) (Kemp and Stevens 2010, 87)). In the case of living rooms, the possibility that the troughs have been misidentified, or that the room has been misclassified as a living room cannot be ruled out; however, the identification of animal presence does not preclude the space being classed as a living room, understanding living room as the space where many of the human activities of the house are carried out, including social interaction. A possible trough in P47.6's room 5 (Fig. 4.40) had fragments of what could be fired clay loom weights; Borchardt and Ricke (1980, 105) assumed that it corresponded to a later use of this 'broad hall', although it is also possible that the object was misidentified as a trough or that it was reused for storage.

In large villas, some of the stables are most likely located outside (Q46.2 rooms 1-6) (Fig. 4.42). The provision of these facilities would have perhaps precluded the need for animal-dedicated rooms within the house.

4.3.3.2.3. Cooking

Cooking activities are determined primarily by the presence of ovens and hearths. This is the most easily identifiable of all the food preparation processes, as preparation of raw food would not require any appliances; in addition, raw food remains are most likely to be recycled into animal fodder or can be discarded outside the house (Weinstein 1973, 271). Where appliances are not present, cooking can also be indicated by the presence of ash and frequently of burnt walls and/or floors. Wall or floor blackening is a non-intentional modification caused by fire-involved activities (Kamp 1993, 308), which occurs only in a few instances within this archaeological sample (see 'internal walls' under section 4.2.). This could indicate that in all the other instances of rooms where cooking took place by means of ovens, a hearth or kiln, there was good ventilation or that the rooms had no roof.

In addition, the presence of burnt walls or floors does not always indicate the presence of food cooking but merely the presence of fire, which could have other uses such as heating up the room. Kramer (1982a, 123) remarked that in Aliabad (a pseudonym for a village in Iran), hearths were in the vast majority of cases indicative of living rooms, which in turn corresponded to the number of families within the house (1982a, 123; 1982b, 669). However, the number of ovens did not necessarily relate to the number of co-residing nuclear families (Kramer 1982b, 670). On the other hand, Castel (1984, 133) observed that the use of the same oven in Qurna by members of the same extended but different nuclear family could be an object of dispute, indicating specific patterns in the use of particular ovens by certain members of the family. The difficulty in distinguishing between the presence of fire associated with cooking and with heating can be seen in the archaeological sample; in Giza house E (Fig. 4.19 top right), room 73 was identified as the kitchen due to evidence for wall damage caused by presumed cooking fires, while room 69 contained evidence of a number of hearths against the east wall (Tavares and Yeomans 2009, 11-12). Both of them were attributed to cooking, however, it is not clear whether the marks could correspond to a different activity. Where bread moulds feature, their identification appears to be fairly certain and this would normally be an indication of bread making, as the possibility that moulds would be stored in a different place to where they would be used appears less likely.

It is worth indicating that cooking and storage activities can also sometimes result in similar remains; for example, ash can also act an insecticide for stored grain due to its protective properties (Miller 1987, 14-16), thus being recycled from its primary place of formation. In addition, charcoal can either point to the presence of a hearth, industrial activity or food processing; it is also associated with wood and sometimes the location of grain storage (Rosen 1991, 98).

An added factor to take into account when identifying cooking areas is that the activity of cooking is highly seasonal, so that cooking mostly takes place in open spaces in the warm months and closed spaces in the cool ones (Kramer in Hardin 2004, 75). This also was reflected in the modern research sample where often there was a provision for cooking facilities, which could be moved easily from one room to another. In the ancient sample, hearths could play this same role, as they would be set up easily in different rooms at different times.

In Lisht, a number of rooms contain remains of fires in A 1.3. (Fig. 4.20), namely **n,** **p** (interpreted as an 'entrance room'), 'private chamber' **i**, and room **b** (which may have served as a cooking chamber for a porter) (Arnold 1996, 15). In rooms **n** and adjoining (no letter) fire remains were distributed across the room, while in rooms **p** and **i** the fire remains were localised in corners. In room **b** the remains were both against a wall and across the room. The fire could have been used for cooking or for warming up as mentioned. Cooking is not an excluded activity, as the concept 'private' does not necessarily indicate any particular use given that, as previously noted, it is culturally determined. However, chamber **n**, interpreted as part of the private chambers, could in fact be the place where the production of those crafts would have mainly taken place; this would be supported by the remains of a vaulted ceiling, including an opening in its lower portion which would facilitate the escape of smoke, together with the extensive amount of fire remains; nevertheless, this interpretation relies on the correct identification of the owner of this property as a craftsman. Alternatively, but seemingly less likely, would be the interpretation of this room as one in which primarily cooking activities took place.

Consequently, A 1.3 indicates the presence of activities related to crafts, but in the absence of conclusive evidence for sleeping, the presence of areas of reception or social interaction does not conclusively indicate that the structure was primarily residential, as it could have also been used both in a 'shop' and a workshop manner.

The Elephantine sample provides an example of areas, which appear to be solely dedicated to cooking. Cooking facilities are well defined as separate chambers with a high content of ash, usually located in the corners most commonly facing north-east or east (e.g. room F H25b, room D in H86a, Fig. 4.27 and 4.28 respectively).

Hearths and ovens also appear within the same room, e.g. room A in H25b; others, such as H25a, have evidence of fire in several rooms (A, B and E) (Fig. 4.26). The ash remains around storage units 0279 y 0230 could be linked to the protection of grain as previously indicated. Room B contained vessels and bread moulds, as well as clay jar seals; this shows the difficulty of distinguishing between kitchen and storage areas, which often can be located together, as seen in the modern sample. In this case, it is difficult to determine whether the predominant use would be cooking or storage, or both equally, as the presence of clay jar seals could indicate storage for the house family or production for others beyond the house. Room D in H86a contained similar material, but no seals, which may indicate the absence of storage.

In Memphis there is significantly less evidence of cooking areas, with the possibility that the houses share a common cooking area outside the house, most likely the large courtyard (Fig. 4.33 space 1), which had remains of several ovens.

An added element related to site formation processes to be taken into account is the possibility of using ash as the foundation for a later building, after the previous building burnt down, as occured in the Karnak sample.

The production of smoke caused by cooking means that the position where this activity is carried out is more susceptible to be subject to environmental considerations. Cooking activities usually presume the provision of either a chimney or some opening for ventilation purposes in the case of the space being roofed, or require an unroofed space such as a courtyard. Nevertheless, in the modern sample cooking often took place indoors without any ventilation, which resulted in blackening of the ceiling. The position of cooking areas in order to allow smoke and odours to escape the house has been repeatedly suggested (Hassan 1933, 38). The archaeological sample suggests that this was indeed a usually important consideration, as most ovens and hearths are located in a position which means that the prevailing north wind, as well as north west in some cases, such as in Amarna (Endruweit cited in Spence 2004, 127) would blow smoke out of the house, either towards empty space or towards the neighbour's house. The fact that some oven/hearths are repeatedly built on top of each other (in Memphis level III, Elephantine H25b room A, Ashmunein j.10 level 1b (Fig. 4.44) would reinforce the idea of a convenient spot. Only in some cases (e.g. Amarna's O47.8, Q47.23 and N49.6 (Figs. 4.35 to 4.37)) did the positions of ovens or hearths contradict this principle. In these cases, it is worth considering whether different factors had a stronger influence; for example, seasonality, which might encourage the use of that location regardless of the inconvenience related to the production of smoke; practical or cultural factors, related, for example, to the preferred location of a craft production area in a certain part of the house. Kamp (1993, 304) pointed out that when several ideal room conditions enter into conflict, priority might be given to a certain one despite the inconvenience caused by neglecting the others, for example having small and few windows might cause stuffiness and smoky rooms, but the need for the windows to be small and few in order to regulate the house temperature supersedes the desire to keep a well-ventilated room.

It is also worth noting that, in the vast majority of cases, ovens appear against the southern wall of the room in which they are located. Assuming that these rooms would have not been roofed, this position favours the existence of natural shade over the cooking area for a great part of the day. Where this is not the case, other factors, such as those described in relation to the wind, might be in operation.

Some properties feature ovens in spaces outside the main house building, e.g. Q27.23 at Amarna, or space 1 in Memphis, although the determination of whether the land is communal or belongs to the house might be difficult in some cases. In the case of Q47.23, an oven exists both inside and outside the house. Modern material shows that ovens can be shared amongst several houses although this does not exclude the presence of other ovens within each house. Samuel (1999, 140), who analysed bread making as a household activity in Amarna's Workmen's Village, concluded that the houses were not interdependent for bread preparation and that individual families or households would be self-sufficient for that task; it is therefore possible that the oven outside Q47.23 belonged to several houses which were part of the same household and produced bread jointly. In the case of Memphis, the absence of ovens inside the houses appears to point at the external ovens as having been a communal facility.

4.3.3.2.4. Sleeping

There are two main reasons in the literature behind the identification of a room as a bedroom; one is the presence of a niche at the back of the room, which would indicate the presence of a bed (Bietak 1994), the other is the location of the room in what is considered a more private area, normally identified as such because of a less accessible location; this is usually at the back of the house or in a space that cannot be reached directly from a front room but instead, requires passing at least through two rooms beforehand (see Fig. 2.2). A feature in connection to the niche and which fits the climatic interpretation is the wind-hood, portrayed in Theban and Amarna representations. They would have been placed above niches in the largest villas of Amarna's Main City to help support them (Spence 2004, 127). Supplementary evidence for the presence of sleeping rooms would be the employment of adjoining rooms as bathrooms, suggested by the existence of waterproof surfaces and stone basins as mentioned in the 'previous interpretations' section of chapter 2 (Spence 2004, 127).

Beyond the issue of whether the interpretation of these niches and the platforms in them as 'beds' is correct, it is difficult to distinguish the use of bed structures for sleeping and/or for social interaction, as seen in the modern research sample. This difficulty is exemplified by the different interpretation made of the niche in room 71 of house E at Giza, which Arnold (1998, 12) identified as an area of guest reception; in contrast, Tavares and Yeomans (2009, 11) described it as having held a bed platform on the basis of the findings in a similar room in the Eastern Town at Giza.

These niches are only found in certain houses of the sample, and only in Amarna (e.g. Q47.23d room 28, O47.8 room 14, P47.6 room 7, Q46.2 room 3 (Figs. 4.36, 4.35, 4.40, 4.42) and Giza (house E), which have been identified as houses belonging to officials and priests; the presence of niches could therefore, whether in a sleeping or social function, correspond to a larger economic capability; however, it could also be responding to the need to fulfil social obligations as noted. In the modern sample, wooden benches (*dekka*) could be used both for sleeping and for receiving guests. Sleeping conditions can be fairly flexible, as has been witnessed in the modern sample, particularly in the poorer houses, and can also depend on whether there are animals or other possessions to be protected, the time of the year (although in the modern sample no evidence was found of sleeping in open areas, such as the roof terrace) and whether any guests are present.

In any case, the absence of niches or bed evidence does not preclude the presence of sleeping areas. Likely evidence would be related to the presence of phytoliths suggesting reed mats (Rosen 1991, 101). Remains of a carbonised mat were found in room **e** of house I at Karnak (Fig. 4.43) associated with fragments of furniture (Anus and Saad 1971, 224-25). Nevertheless, this does not clarify the potential fine line between sleeping and social interaction, which refers to cultural sensitivities difficult to establish from the archaeological record.

4.3.3.2.5. Social interaction

Areas for social interaction can take the shape of spaces purposely designed for welcoming guests or refer to spaces that are used predominantly as living rooms within the family. In addition, some spaces could potentially be open to interaction with commercial purposes and this is usually suggested by the presence of a high concentration of a certain object type (Hardin 2004, 74) e.g. possible commerce of flints in room 18 in level III (Jeffreys 2006, 17) and room K in H86b, both of them being directly accessible from the street (Figs. 4.33 and 4.29 respectively).

The existence of spaces exclusively dedicated to receiving guests could be linked to the examples of the largest houses, such as the Kahun and Amarna villas, in which the ability to retain areas where people can be welcomed might be a requirement. In this way houses such as the Kahun mansions would demonstrate their parallels with palaces. In other houses, sleeping and social interaction spaces might be interchangeable as seen in the modern sample.

The presence of high quality flooring, for example in rooms G and H of Elephantine H86b, has been used to justify the existence of spaces whose predominant role is to serve as living rooms; these spaces could also be considered reception areas, following the rationale explained in the 'floors' section.

4.3.3.2.6. Courtyards

Interestingly, the archaeological question of the relation between courtyards and roofed halls was raised by Arnold (1989, 70-81), who considered it both a central part of the house in the Middle and New Kingdom periods. He pointed out that it was unclear whether there were any conceptual differences between a court and a hall, as both were designated with the term *wsẖt* by the ancient Egyptians (Arnold 1989, 80). Therefore, his archaeological distinction between hall and court appeared to be based on the presence of pillars in the 'halls' of New Kingdom houses, for example at Amarna, while these pillars are absent in the Old Kingdom 'courts' (see floor plan comparison, Arnold 1989, 79). However, as explained in chapter 3, wooden beams can span over a width of 2.5-3m and hold a roof without need for any further support. Unfortunately, these wooden beams can rot away and leave little trace in the archaeological record. Furthermore, as repeatedly shown in the samples collected, rooms can be roofed with piled dry branches, which are even less likely to leave a trace.

As seen in the modern sample, courtyards need not be ubiquitous in mudbrick houses; in addition, they are not always in a central position, but can also be located on the sides or at the back of the house. It is also possible for a house to have more than one courtyard. The modern sample demonstrated that the location of the courtyard did not affect the kind of activities performed there, notably domestic chores. In the case of cooking in rooms supposedly identified as courtyards in the archaeological sample, as long as the orientation of ovens within the room was correct, the position of the courtyard would not influence performance. Morever, the presence of cooking devices, particularly ovens, is not a necessary indication of the lack of roof in the room, given that features such as roof openings can provide solutions to the problem of extraction. With regards to the ventilation and light role traditionally associated to the courtyard, this could be provided by high-placed windows such as those seen in the Theban representations.

Therefore, the identification of courtyards should be primarily made on the basis of the physical difficulties connected with building a roof and within the consideration of other features which might have assisted in performing the roles generally attributed to the courtyard. Nevertheless, the possibility should be acknowledged that the room might be in fact partially covered. Conversely, small rooms would have not been necessarily roofed.

4.3.3.3. Use of space beyond ground floors

The existence or not of one or multiple storeys in ancient Egyptian houses is a highly contested issue due to the lack of evidence, as has been previously explained in chapter 2.

Spence (2004) suggested that second storeys and even third storeys would have been common in Amarna, and that the rooms on the first floor would have been, most likely, private family rooms (Spence 2004, 150). She thus extended Kemp's (1989b, 296) previous interpretation that these rooms were reserved for women to include a broader sense of privacy (Spence 2004, 150-151). Accordingly, these rooms would have functioned in parallel to the ground floor, which provided space for formal and informal interaction and for work (Spence 2004, 151). In the case of the small houses in the Main City, the existence of upper rooms for sleeping would have been even more convenient, given the amount of activities taking place downstairs (Spence 2004, 151). However, this does not necessarily seem to be the case, as the modern research sample shows that many activities can take place within the same rooms and that a clear division between private and other activities cannot always be established, at least in the case of the smallest houses. On the other hand, sleeping rooms do appear in first floors across all modern sample areas, but not exclusively.

There are two fundamental architectural features that can provide clues to the presence or absence of upper storeys: roofs and staircases.

First, it seems evident that roofs need to be of a sturdy type to be able to resist the weight of another floor above them. However, as witnessed during fieldwork in the northwest Delta, upper storeys are the first part of the house to collapse when the house is not being maintained. From an archaeological point of view, the former presence of upper storeys might be indicated by the presence of excessive filling deposits (Spence 2004, 125). However, it can sometimes be difficult to distinguish between materials that have fallen into the room from above and previous room contents (Kamp 1993, 307).

Secondly, in the archaeological literature, the presence of a staircase has not been considered as an exclusive indication of the presence of upper storeys, as it has been argued that a staircase could be leading directly to the roof instead (e.g. Davies 1929, 249). While this might be true, in the modern research sample, despite the varied position of the staircase, it led in all cases to a roof terrace and not directly onto a roof. In addition, a staircase was not present in any of the single-storey modern house examples. Without ruling out the possibility of single-storey houses with walkable roofs in the archaeological record, the modern research findings indicate that the presence of a staircase is overwhelmingly associated with that of superstructures in the upper storey. Nevertheless, this storey did not occupy the totality of the ground roof in any case, forming a roof terrace which was sometimes used for storage and some utilities, such as drying clothes. It most often had storage bins or containers, as well as roaming poultry. On the other hand, the first floor rooms in several cases used to be bedrooms that had later been 'demoted' to storage rooms, whose roofs were not walked upon.

Consequently, the focus of the archaeological debate, rather than being placed exclusively on whether the staircase leads to an upper storey or a roof, should perhaps concentrate on whether the superstructures likely to have occupied the upper storeys did so totally or partially – that is to say, as a full floor or as a roof terrace. Parallels for this suggestion can be found in artistic representations, e.g. the terracotta models, as well as in temple structures with remains of small huts on the roof.

Despite the largely restricted evidence, the existence or not of second storeys is crucial for the discussion of space, as it would have also had an effect on issues such as ventilation, which in turn affected the conclusions about certain features, for example the position of ovens.

4.3.3.4. Discussion

With regards to the study of the use of space, this section has proposed a shift in focus from the attribution of functions to rooms and the analysis of their position across houses, to an individual analysis of the manner in which contextual factors, ranging from general to particular, affect architectural solutions within the particular circumstances of each house, independent of whether these solutions are considered optimal by modern Western standards or not.

The particular environmental conditions of the site, including the prevailing winds, would have influenced the general orientation of the houses, as has been described, for example, for Amarna. This general orientation would have in turn affected the position of features such as ovens and cooking areas. Sunlight is another factor which could have also affected the primary location of certain activities, such as cooking; however, it is likely to have had a larger influence in the short-term diachronic use of the space, causing some activities to 'move' across the house at the convenience of escaping the strong sun, particularly at certain moments of the day, notwithstanding that other cultural priorities might prevail and result in an alternative arrangement. In addition, it is worth considering that while environmental factors might be taken into account, the particular solutions into which these translate might also depend upon the economic capability of the owner (Kamp 1993, 304).

Secondly, cultural factors can be observed at two levels; certain cultural factors are shared by all segments of society, while others relate to the specific social group of belonging and the status within society. Traditionally, in the modern mudbrick house, agriculture, as the predominant activity carried out by the villagers, determined much of the distribution and use of space of the house, with, for example, a large amount of rooms dedicated to storage and to animal keeping. Although the main working activity originally dictated the structure of the house, the social aspirations of the villagers also played an important part. For ancient Egypt, the social aspirations regarding the ideal of 'home' have been inferred from representations such as those of the Theban tombs (Shaw 1992); however, these do not necessarily need to be a translation of the aspirations and priorities of lower classes, as practical and professional factors might have played a larger role than that of the symbolic portrayal and appearance within society, which might have affected the upper classes more extensively. The specific aspirations or desires of each group would be reflected in the particular overall distribution of the house but also in the presence or location of certain activities, particularly social interaction. For example, aspirations might materialise in the need to have multiple rooms in which people can be welcomed. This is also in connection to the 'secondary role' the house takes aside from that of being an abode for a family or families; in the case of the mansions, for example at Kahun, it would appear that the houses are taking the secondary role of an institution, and consequently mirror much of the requirements and corresponding architectural solutions of palaces; the enormity of the features in the mansions, with unnecessarily large courtyards, abundant number of columns, etc., suggest the need to cause a powerful impression on the visitor. Indeed, this institutional role could arguably be their primary one. However, in the case of a house in which a craft is being carried out, the ‘secondary role’ of the house could mainly be that of a workshop, therefore the performance of these activities might have a priority and the distribution and use of space be arranged to suit this particular need of the owner as a professional, with the ideal home being one which suits those needs to perfection.

In any case, this suggested interpretation of secondary roles of houses should be mainly focused on the main practical role, aside from that of shelter, being assumed by the house; if the attribution of the secondary role is merely based on the social class which is attributed to the owner of the house, then there is a high risk of imposing our own assumptions concerning individual houses.

A further cultural aspect is related to issues of gender and its effect on the use of space. During the study of the modern material, it was pointed out that the use of space according to gender might be in relation to the presence or absence of strangers to the house (see section 3.3.2.2.). Numerous studies have concentrated on the possible attribution of certain activities and areas to different genders, particularly in relation to Household Archaeology analysis in different parts of the world (for a wide range of examples, see Allison 1999). As has been outlined, some areas in the larger houses have been identified which potentially could be reserved to women. In smaller houses, perhaps the variation according to gender may only be in relation to outside visitors, as pointed out for the modern material. On the other hand, the possibility of certain activities being carried out by women suggests a practical correlation in the predominant female use of some spaces and not others. Therefore, while priority has been given in this study to different considerations other than those related to gender, it is also worth taking into account the potential influence of that factor.

Certain cultural attributes and the existence of a social code shared by the inhabitants of various houses by virtue of their status might also encourage the performance of certain activities in certain areas.

On the other hand, practical experience might derive in a certain association of spaces to suit particular types of activities. In the model proposed by Bietak (1994) and described in the ‘previous interpretations of house plans’ section of chapter 2.1.1., there was a parallelism in a tripartite arrangement between the core unit of the temple and the private area of the individual house which he interpreted as a proof of the parallelisms in design between religious and domestic architecture. However, in a practical sense, this could rather indicate that that particular tripartite arrangement — a central space with two side rooms and an anteroom — suits a certain activity/activities carried out there; consequently, it could be representing a parallelism in the type of primary activity carried out in the main space (offering room/living room), which might benefit from the presence of auxiliary rooms in both cases (cultic rooms/bedroom and side room).

In terms of the particular community circumstances in which each house is inserted, it has already been noted that they had an influence in the features and spatial distribution. As seen particularly for storage, the way in which each community organises the supply of food can have a direct influence on the use of space within individual houses; for example, if the authority within the community has a strong control of the distribution of food resources, then this might result in a smaller amount of space dedicated to storage within individual houses. In the modern sample, Lozach (1930, 24) described how some villagers, who worked for landowners, did not need large storage harvest spaces as they had little or no produce of their own. The productive organization and land ownership therefore had a direct influence on the role of storage within the distribution and use of space in the house. Other factors, such as the availability of space in communal areas to undertake certain activities, for example cooking, might result in less ovens being needed within the house. In any case, as has been repeatedly pointed out, these correlations are not immediate, and the possible associations must be established within an awareness of all the other influential contextual factors, which may favour or discourage such interpretation.

Lastly, there is an individual dimension which must be taken into account and which transcends, for example, the performance of the duties of a certain profession. In an organic development, the individual wishes of the inhabitants of each house should not be underestimated. In the modern sample, there was a range of solutions developed by individuals to suit their particular needs or tastes; the use of space might mirror this range of solutions in an essentially individual dimension which reflects the ties of the family and the history of the house itself; it can also reflect the values and beliefs of the individual; for example, in interview 5 of the modern sample, the belief in the negative effects of the evil eye was listed as the main motivation for one individual to place her animals at the back of the house, in order to be protected from it. Changes in family structure might have also had an impact, as seen in the description of the inhabitants of the household of Hori and Sneferu (Kemp 2006, 221) where the amount of people and the proportion of men and women varied throughout time. Both these variations could have had an impact on distribution and use of space. This is probably the most difficult factor to identify in the archaeological record, but nevertheless it is an important aspect to be considered and one which might offer an explanation for possible variations or deviations from the 'norm', if indeed there appears to be some, even within the same class.

This section has sought to demonstrate that it is possible to achieve an understanding of house dynamics through the analysis of the use of space within context, without the need to establish prior assumed patterns in which to fit those dynamics. Despite the fact that this approach makes generalisations more difficult, it seems more appropriate to capture the dynamism that fundamentally characterises life in a mudbrick house.

4.4. Conclusion

Chapter 4 has adopted a new approach to the analysis and interpretation of ancient Egyptian archaeological sites through the application of the methodology developed for the study of modern mudbrick houses. It has analysed the context and material of a number of Dynastic archaeological sites across periods and areas, and offered a new analysis of the distribution and use of space based on an ethnoarchaeological study.

Such analysis takes into account a series of environmental factors, such as climate, regional topography, the movement of the river and the effects of flood, together with man-made ones such as land reclamation, which have an influence on sites. The sample suggests that the particular topographic characteristics can have an effect on the distribution of areas within the site, including settlements. In turn, there appears to be some correlations between the distribution of settlement areas and the presence of certain house sizes; a higher amount of large houses is present in plain settlements, while small houses are more numerous in mound settlements. This suggests a correlation between the natural limitations of space and house size, although more research is needed. Environmental factors affect both architectural features and the distribution and use of space; however, while the evidence of impact in features was limited, the influence of environmental factors in the distribution of space materialised in the particular orientation of the house, which in turn affected the location of architectural features susceptible to be affected by sunlight and wind, such as ovens.

Similar to artistic production, architectural features could have been affected by tradition and the revival of trends, but also by the development of local styles, in particular in local centres with a certain degree of independence. In a sociocultural dimension, status might be portrayed through the presence of certain features and not others, directly – for example through the use of superfluous columns – or indirectly, through the suggestion of a certain activity, for example in the case of the mastaba, which could have been used for guests' reception; more often than not though, status is reflected in the degree of elaboration or decoration of a commonly available feature.

Distribution and use of space would also be affected by sociocultural factors; the association of certain spaces might indicate their relevance or a certain primary activity, as seen in the case of the tripartite arrangements. Practical, professional and evocative factors also operate in relation to the secondary role taken by the house.

Ethnicity factors, for example in the case of Tell el-Daba can also have an influence on the different house arrangement and a use of space which does not appear to fit within the norm, for example the presence of burials. Nevertheless, certain 'odd' features might also be portraying individual preferences.

The particular circumstances which define the community are also relevant; the reason for the existence of the settlement and its foundation or not prior to the period in question must also be considered, as well as the presence or absence of other settlements within the site and the effect this might have on the segments of society represented within each individual settlement. In addition, the internal organization of the settlement, for example in terms of food distribution and supply, might translate into the presence or absence of certain features, such as storage containers.

Community circumstances also directly affect individual factors, for example the existence of an extended family or specific household arrangements, status, occupation, religious beliefs and other social and cultural traits. Particular taste and the specific history of individual houses are also likely to have a reflection in architectural features and distribution of space.

The analysis of the archaeological data suggests that establishing general conclusions regarding the relation between houses in the sample across time and period is difficult, most likely because of the large amount of factors involved and the degree of individuality. For that reason, the analysis suggests that, if we are to achieve a meaningful discourse, the necessary approach is first, the contextualization of the site and settlement in question within the period and area; secondly, the specifics of the settlement and the particularities of the community should be analysed; lastly and only once relative conclusions for each settlement have been established is it possible to compare settlements across different sites. This approach would offer a contextualization of each settlement in relation to the archaeological material found; the establishment of that relation between context and material within each settlement would then allow for a fair comparison of archaeological features and space distribution between settlements. Consequently, this approach combines, on one hand, the exploration of the cultural and individual diversity brought by a study of individual settlements; on the other hand, it allows the synthesis between settlements that is necessary in order to develop a general discourse about ancient Egyptian houses.

Through this process, a number of relevant analytical and interpretative tools have been tested, which will be compiled and presented in chapter 5 ‘interpretation’.

Chapter 5: Discussion and interpretative tool

5.0. Introduction

Chapter 4 saw the application of the study of modern mudbrick houses to the archaeological remains. Through it, a series of concepts were identified as useful for the development of an interpretative tool for ancient Egyptian houses. This chapter will evaluate the process of development of those concepts and assess their practicality and potential for enhancing our understanding of mudbrick houses in ancient Egypt.

The aim is to offer an approach that allows a holistic interpretation of the archaeological evidence, thus helping understand its gaps and problems and giving new tools for the discussion of the archaeological remains; as a result, a deeper understanding of the connections between context and material and the use of space in ancient Egyptian houses can be achieved.

This chapter also aims to show the further implications and applications of this research, both theoretically and practically. The ethnoarchaeological study has implications for the sources of previous interpretations and for the various approaches to the study of ancient Egyptian houses; it also has repercussions for the archaeological record. Ultimately, the basis of the interpretative tool could be applied to mudbrick houses in other cultures, provided the necessary adaptations are made. On the other hand, the data collected, methodology and theoretical approach contribute to the topic and to other sciences, while they are still subject to certain limitations.

The assessment of the research undertaken, the resulting interpretative tool and its wider implications will generate a ‘Reflection’ in Chapter 6; on the other hand, the identification of the limitations will be the basis for its ‘Recommendations’ section.

5.1. Research problems and solutions

The research set out to provide a new set of interpretative tools and methodology for the study of ancient Egyptian mudbrick houses. The overall argument was that an ethnoarchaeological study informed by a holistic approach to the subject could help develop those tools.

Chapter 1 demonstrated that, in Egyptian archaeology, the subject of domestic architecture has been less explored than other aspects of Egyptian culture. When large excavations in Amarna, the best known settlement to date, started at the turn of the 20th century, an interest in domestic architecture was sparked, but this interest was directly focused on a formal study of Amarna's house plans, with a view towards using that information as a central piece of the discourse regarding ancient Egyptian houses as a whole. Categories which would be used henceforth to classify ancient Egyptian houses were developed, such as the tripartite house; furthermore, the so-called standard Amarna villa, a house arranged around a central hall, became a paradigm of the perfect Egyptian house. Much later, in the 1970s, with the beginning of systematic excavations in sites such as Tell el-Daba, and the rise of urbanism as a topic, particular studies of sites started taking into account the environmental context in which houses were embedded. To that end, reports on animal remains, plant remains or pottery were incorporated as these became a fundamental part of modern archaeological literature and of understanding ancient living conditions. Domestic architecture was considered another tool to understand the social and productive urban dynamics. Over time, although a more holistic study of these settlements has been developed, this has not necessarily been the case for smaller settlements.

Therefore, although settlement studies developed to include a wider range of influencing factors, these were not clearly identified and defined as key elements for a broader understanding of domestic architecture; hence the practical ways in which they affected house features, distribution and use of space were not explored.

Consequently contextual and material factors were not directly applied to the analysis of the domestic architecture remains, neither were they directly incorporated into the general discourse concerning ancient Egyptian houses. In fact, for a long time no new additions were made to the specific understanding of houses. In the

1980s, the large amount of work done at Amarna allowed for the understanding of many aspects of domestic architecture, which materialised in contributions such as those by Janssen (1983), Tietze (1985, 1986) or Crocker (1985), all based on the houses at Amarna's Main City. Furthermore, the conclusions derived from the study of these houses were taken as a reference point for the study of houses in all other sites. Consequently, Amarna has continued to play a central part on the general discourse about ancient Egyptian houses despite the doubts on whether it is representative of other settlements. On the other hand, none of the studies concentrated on analysing the importance of mud and the role it played in the architecture and in the living experience, even though the vast majority of houses were built with that material.

Kahun, the best known example of an ancient Egyptian planned settlement, was also considered by scholars such as Arnold (1989) and the findings at Tell el-Daba were progressively incorporated into the general discourse especially from the 1990s, but Amarna continued to dominate this discourse conceptually. The study of Kahun and Amarna focused on certain themes which henceforth became key topics in the discourse about ancient Egyptian domestic architecture, such as the existence of a central courtyard or hall with a main role in the house, and social differentiation based on house size. The Tell el-Daba excavations focused in domestic architecture in as far as this was a key element to understand the urban environment.

Consequently, the main disadvantage for the development of knowledge was that not enough sites had been studied holistically and therefore the general assumptions relied heavily on a small group of sites with specific peculiarities. The fact that the information available at Amarna was overwhelmingly larger and more detailed than that of any other site probably contributed to driving the focus away from the contextual factors surrounding each site and centring it on a comparison of the features found in Amarna.

A further issue was that those sites gave information only for specific periods. A broad approach puts much emphasis on the influence of contextual factors on architectural responses; this means that having information for only specific periods is deemed likely to restrict the responses shown, at least with regards to some of those factors, even though mud is the common building material regardless of period, location and social differences.

A further difficulty for the advancement of the general discourse on ancient Egyptian houses was the use in some cases of different definitions for architectural features and the lack of a standardised method for describing them, which meant that each report was different in terminology, making it harder to synthesise the information from various sites.

This thesis therefore set out with the aim of overcoming the lack of standardisation, moving the focus away from the best known sites by incorporating a holistic approach derived from the study of modern mud houses and applying it to the study of ancient Egyptian houses; this allowed a study of all factors operating in mudbrick houses while facilitating a comparison across sites and periods.

The universal character of the categories established allowed for different responses to a certain number of factors to be recorded; this means that potentially this same methodology could be applied to other culture and environments, although this would require further research in order to adapt the system to the particular end sought, whether specific studies of sites across time or an exploration of architectural solutions across cultures or environments.

A fundamental point of the new framework proposed was the consideration of buildings as material culture, thus being fully influenced by context, a fundamental concept in archaeology.

In order to explore the relations established between material and context, it was necessary to first identify the types of relationships which could occur; many of these aspects are related to the act of living in the house. Because these aspects are lost in the archaeological record, it was necessary to focus on those relations within a living environment, namely modern Egyptian mudbrick houses, which shared their building material with ancient ones as well as certain contextual factors, such as the importance of the river Nile. In order to further explore those factors, three different areas were selected, which had slightly different environmental conditions. These areas were the Nile Delta, the valley and the Dakhleh Oasis. This also allowed for the exploration of factors such as localisms, isolation, etc.

Therefore a theoretical framework was established in which the study of interaction, contextual and material factors was the driving force. Consequently, methods were used which tried to cover the study of these different factors. The main tool which would inform the development of this methodology was an ethnoarchaeological study.

In the study of the modern houses in Chapters 3 and 4, the context and material were analysed and types established within them in order to provide study categories for the methodology. The contextual factors established were: environmental, sociocultural, community-related and individual-related aspects. Architectural features were divided into external and internal, and for each one of those the following categories were established: roofs/ceilings, walls, doors, windows and features/others. The impact of context and material on the distribution and use of space was then explored and the following main activity areas were identified: storage, animal keeping, cooking, sleeping and social interaction.

Those categories were then applied to a series of archaeological remains from a wide range of periods and locations with the aim of identifying a series of key concepts and influences in mudbrick houses. These variables have been developed into an interpretative tool, which will be presented later in this chapter, whose aim is to provide a resource for the future recording, analysis and interpretation of ancient Egyptian houses.

5.2. Meeting the aims and objectives: An assessment

5.2.1. Main objective: an ethnoarchaeological study

As explained in the section above, previous approaches to the study of ancient Egyptian architecture have left many questions unanswered due to the absence of a methodology to analyse architectural remains of houses and the potential unreliability of other sources, such as artistic representations. The main obstacle was that typologies controlled the study of the distribution of space, while the presence of objects played a central part in the interpretation of the use of that space, despite the fact that that approach does not account for any flexibility in that use. The relation of the archaeological material with artistic representations of houses was also problematic due to the apparent lack of correspondence in some of the details, partially caused by the difficulty in interpreting some of the representations.

Many aspects are involved in building and they must be understood holistically. However, many of these aspects are not easily reconstructed from the archaeological record. For that reason, an ethnoarchaeological approach was proposed as a method as it facilitated the reconstruction of the link between material culture and cultural context. In fact, an ethnoarchaeological method allowed for the inclusion of aspects that related to the actual living and practical day-to-day use of the house; this showed the flexibility involved in the actual use of mudbrick houses and allowed some of the assumptions related to the use of space to be challenged. The driving force was therefore the material, the architecture and the inhabitants of the house, helped by the analogies established through ethnoarchaeology, while objects were not included.

Ethnoarchaeology provided practical information on aspects concerning the physical characteristics of the house and a theoretical analysis of the influence and proportion of contextual aspects in these characteristics.

5.2.2. Sub-aims 1 and 2

Sub-aim 1 was to achieve a theoretical understanding of factors potentially influencing domestic architecture, with relation to interaction, contextual and material factors. This was achieved through the compilation of information regarding the processes which might have influenced Egyptian mudbrick houses in the last century, as well as through interviews and observation (objective 1).

Sub-aim 2 aimed to increase the knowledge about the construction process, the characteristics and the development of modern mudbrick houses in order to gain a better understanding of the physical aspects of the archaeological remains. This was achieved through architectural surveys and observations in the Delta and the Nile valley, as well as the compilation of information previously published for these areas and for the Dakhleh Oasis (objective 2).

The data collected and analysed from modern mudbrick houses provided information regarding the type of factors involved in the living dynamics of mudbrick houses. The archaeological relevance of this data was its ability to provide information regarding factors which determine the aspect, distribution and use of houses.

The data collection and analysis established a series of categories which were based on the relations between context and material, and which could serve for the standardised description of the archaeological remains. Furthermore the analysis also provided a theoretical understanding of the types of links that are established between material and context in mudbrick houses.

5.2.3. Sub-aim 3

Sub-aim 3 was to apply the knowledge regarding contextual factors and material properties towards a comprehensive understanding of modern mudbrick houses in each one of the chosen areas.

This was achieved through the description of the impact of the particular contextual and material relations in architectural features, distribution and use of space in modern houses (objective 3). Completing this objective fulfilled sub-aim 3 by providing evidence for localisms and particularities of specific locations and areas as well as an insight on how important are environmental factors and what is the balance between these and sociocultural factors.

The archaeological relevance of this contribution was that of providing reasons behind the recurrence of certain features and the potential similarities and differences between features across settlements. It was also useful in giving an insight into the kind of architectural features that can be subject to local trends.

5.2.4. Sub-aim 4

Sub-aim 4 was to examine a series of archaeological sites in light of the result of the study of modern mudbrick houses, in order to show the potential of this approach.

This was achieved through the application of the method developed for the analysis of mudbrick houses to a series of archaeological house remains, with the purpose of investigating their context and material (objective 4).

The completion of this objective provided knowledge about the archaeological remains and allowed the reinterpretation of some of them in the light of the categories developed and the relationships and type of links identified through the modern houses.

5.2.5. Sub-aim 5

Sub-aim 5 was to articulate the developed tools into a methodology for the study of ancient Egyptian domestic architecture and to develop guidelines for future work.

This was achieved through a checklist that can be used for the interpretation of house remains to be excavated and the identification of the areas where future work could be undertaken (objective 5). The completion of this objective provided a summary of everything that has been concluded through the ethnoarchaeological study and condensed it an interpretative tool, which is the object of the following section.

5.3. Creating the interpretative tool

The aim of this tool (which can be found at the back of volume II) is to provide a methodology for the analysis and interpretation of ancient mudbrick house remains which facilitates an orderly and standardised material description. More importantly, the tool seeks to present the potential relations between context, architectural features, materials and space in order to provide a new range of interpretative possibilities and to challenge some of the connections assumed by previous interpretations. The relations proposed have their basis on the ethnoarchaeological study presented in chapters 3 and 4. The set of relations that form the interpretative tool are, however, not meant to be understood in a deterministic manner. Instead, the interpretative tool constitutes a non-deterministic protocol providing a range of interpretative possibilities whose likelihood is heavily determined by the individual application of the tool to specific cases.

Through the analysis of the modern material, a number of variables were identified which appeared to have an influence on the physical characteristics of mudbrick houses. During the application of the modern contextual and material categories to the archaeological remains, it was found that some of these variables had an apparently clear correlation in the archaeological record, while others pointed towards unproved relations. A number of them did not find any correlation; where other features which were present suggested that such correlation might indeed have existed, those variables were included even if no direct correlation was found in the archaeological record; where that parallel evidence was not available, they were excluded from the rationale.

The tool is formed by three sections:

- Section 1 provides some elements of settlement contextualization prior to the analysis of specific houses.
- Section 2 forms the core of the tool and provides a method of analysis and interpretation for the most common domestic architectural features found across both modern and ancient samples.
- Section 3 suggests elements of comparison, both within the settlements and between houses across different settlements, once section 2 has been applied to individual houses.

Section 1

Section 1 is formed by a single 'frame' which includes some aspects of site and settlement that have been identified as having an indirect effect on some of the variables contained in section 2, but that usually have no direct identifiable correlation in the physical material. These aspects may be informed by other structures found within the site aside from the settlement of the main population (i.e. palaces and temples with textual, epigraphic or material information) and they facilitate the identification of the variables in section 2 by providing the contextual background recommended throughout the thesis. They can also assist in the comparison of houses across different settlements. The following aspects have been identified:

Isolation: the modern sample showed that geographical isolation might have been the reason behind the development of particular architectural characteristics, e.g. the architecture of the Dakhleh Oasis.

Function: The reason why the settlement was originally founded is a factor to be considered in its interpretation.

Chronology: Whether the settlement was founded in the period in question or existed prior to that is also a factor to consider when evaluating the influence of global and local traditions.

Balance central-local powers: The literature regarding the ancient context suggests the existence of a different degree of political and cultural independence of different sites within the same period and across time. Like isolation, this proximity or long distance from central powers affects local production, and could have also affected architecture.

Other settlements within the site: The existence of different types of settlements (e.g. workmen's village as opposed to stand-alone villas) within the site can have an effect on the particular social groups represented within each settlement.

Planning: Establishing the degree of planning in the settlement (e.g. state orthogonal plan vs. individual development as needed or as possible) can be helpful, especially in assessing how the structures developed as a result of those modifications compared to those which developed organically. Organic and planned development may not be mutually exclusive, e.g. enclosure walls can be built up against organically and be incorporated as private house walls.

Section 2

Section 2 is formed by 20 frames and constitutes the core of the interpretative tool.

- Frame A contains the list of external and internal features used for the classification of the modern and ancient material.
- Frame B offers a classification of features according to their possible functions.
- Frames C to J refer to the variable groups that have been identified as a result of the ethnoarchaeological study (environment variables (C), material variables (D), social and cultural variables (E), community and individual variables (F), space alterations (G), activity areas (H), individual house characteristics (I) and archaeological processes (J)). Each frame contains a series of specific numbered variables which have been identified as belonging to each general group.

Each one of the features in 'frame A' is contained in a separate individual frame. The information in each one of those frames relates to frames A to J and their numbered subdivisions. The particular relations suggested between the features and the different variables are defined through the following links: 'related to', 'subject to', 'modified by', 'encouraged by', 'not encouraged by' and 'enables'.

'Related to' suggests a link between the feature and the variable, which can manifest itself to different degrees of strength and clarity.

‘Subject to’ indicates that the feature is likely to be directly and substantially modified by a certain variable, when this one is in operation; ‘modified by’ means that that variable consistently has an effect on the feature.

‘Encouraged by’ and ‘not encouraged by’ refer mainly to environmental factors which may or may not prompt the need for a certain feature.

Lastly, ‘enables’ recognises that the relations between variables and features are bidirectional and that, in some cases, the features may activate some of the processes condensed in the variables.

Nevertheless, these relations are not *sine qua non* but rather portray the range of associations that have been found through the ethnoarchaeological study and are therefore conceived as a series of factors to be taken into account when interpreting ancient house remains. Some of these relations are less physically recognisable than others; however, evidence can be strengthened through comparison with the assessment of other architectural features and the contextualization of the settlement (section 1).

Finally, section 3 contains one ‘frame’ which offers some possible reasons for variability within a same settlement and between various settlements, based on the information obtained after the application of the section 2 parameters.

Each group of variables and its subdivisions will now be briefly outlined to explain the reasons behind their inclusion in the methodology.

ARCHITECTURAL FEATURES (A): This frame presents a list of architectural features according to the classification used for the ethnoarchaeological study. The classification was based on modern architectural description methods and aimed to provide tools for an orderly description. Many features are structural, therefore were found both in modern and ancient houses. Although most of the external and internal features/others (A5 and A10 respectively) could also be found in both modern and ancient houses, some variability occurred between both samples.

For the interpretative tool, external features (A5) were divided into: ovens, mastabas, drainage barriers and storage bins.

- Ovens appeared occasionally on the outside of both modern and ancient houses, although they were most commonly located inside.
- Mastabas were found outside the house in many modern mudbrick houses. In the ancient sample there was only one example on an external mastaba, with numerous mastabas found inside the house. Nevertheless, they have been included in this section as their alleged similar use suggests that external mastabas could also be present in the archaeological record.
- Similarly, drainage barriers were not present in the archaeological sample studied, although at Kahun a drainage channel, built with stone and running through the middle of several streets, was found; in addition, modifications to features with a similar purpose were found, such as the high thresholds to avoid the flood at Tell el-Daba.
- Lastly, outdoor storage bins were found in some modern mudbrick houses and in one house in the archaeological sample (Lisht). The fact that it was full of grain indicated that this bin had not suffered the effects of ordinary archaeological processes; therefore, other external bins might have existed but disappeared.

Other modern features, such as balconies, were excluded from the list as no evidence was found in the archaeological record; in addition, there were no other features which suggested their possible presence. In any case, this is a feature that could be considered in the future, if a better understanding of upper storeys is achieved.

Internal features (A10) were divided into floors, ovens, staircases, mastabas and storage units:

- Clay or brick floors were hardly present in the modern mudbrick houses, but they were common across the archaeological sample; evidence for them was preserved across most settlements. Similarly, columns were absent in the modern mudbrick sample, but were a feature in some houses of the archaeological sample.

- Ovens revealed themselves as an important feature associated with mudbrick houses, modern and ancient. They were found across periods and sites in the archaeological sample.

- Similarly, evidence for staircases was available in houses across the modern and ancient sample. Their presence has implications for the existence of upper floors/roof terraces; it even has an influence on ventilation.

- Another feature present in both ancient and modern houses was the mastaba, as mentioned previously.

- Storage units were also commonly found across modern and ancient sample, evidencing the importance of this activity in at least some mudbrick houses.

FEATURE FUNCTION (B): This frame provides a classification according to the functions identified throughout the study of modern mudbrick houses.

B1. Structural features: They contribute decisively to the physical integrity of the house, such as walls.

B2. Decorative features: They can be defined as those whose main purpose is merely that of being ornamental, although they often are a vehicle for the expression of identity in various forms.

B3. Adaptive features: They are developed to adapt to the surroundings, such as the drainage barrier.

B4. Practical features: They are those which are not essential to the integrity of the house but are developed as a response to particular needs, such as niches to hold oil lamps.

ENVIRONMENTAL VARIABLES (C): This category details the environmental variables that can have an effect on the various architectural features.

C1. Settlement location: The study of the modern mudbrick houses during the 20th century appeared to indicate that settlement location had an influence on houses being extended or dense. Similarly, in the archaeological sample analysis there seemed to be a suggestion that a similar correlation might have also existed, with mound locations having a larger amount of smaller houses. The most visible physical correlation of settlement location is caused by the nearness of the site to the river or to the desert, which has an influence on the particular soil, sediment or clay with which the house is built.

C2. Climate: The action of rain, sunlight and wind are important factors in housing in general, therefore applicable to both ancient and modern houses.

C3. Hydrography and flood: The effects of the movements of the Nile, and the annual flood of the Nile have proved to be important across history and have influenced the internal distribution of sites.

C4. Land availability: The area of land available has been suggested in the past as the reason behind the presence for extended houses in Amarna. The study of Egyptian modern mudbrick houses across the 20th century also hinted at the influence of this factor on the distribution of the house. As explained in the analysis of the archaeological sample, the particular land available on the site might or might not affect the settlement area; however, the settlement area can potentially affect the distribution and appearance of houses.

PHYSICAL VARIABLES (D)

These are processes which were identified through the study of modern mudbrick houses as operating in the house, therefore modifying the physical characteristics of the house.

D1. Maintenance/repairs: Maintenance is essential in mudbrick houses due to the organic nature of the building material which makes it is easily susceptible to the action of the elements, hence why maintenance needs to be carried out regularly. For that reason, these processes, documented for modern houses, are most likely to also have occurred in ancient houses. These maintenance processes can be carried out in the short and in the long term. Short-term maintenance refers for example to sweeping and general daily cleaning; medium to long-term maintenance includes the process of re-plastering walls every year and repairing the roof.

D2. Recycling: This is also a process encouraged by the organic nature of the building material; mud features, such as storage bins, can be repeatedly recycled into other features to suit, for example, seasonal needs. Recycling can also be passive, with elements being incorporated to certain features, for example, while maintenance is taking place.

D3. Lateral cycling: This process, which had been previously described for artefacts (David and Kramer 2001, 93) was incorporated into the methodology as it was deemed fitting for the description of a process occurring in mudbrick buildings whereby the feature keeps the same function but is used by a different person; re-used lintels in the archaeological sample are evidence of this process.

D4. Secondary use: This process, also originally described for objects**,** consisted in the use of a feature for a purpose different to that for which it was made; in the modern sample, this was observed in the re-use of pieces of stone from nearby archaeological sites which are often re-used as lintels, steps, etc.

D5. Collapse: In the modern sample, some features were observed which were susceptible of collapsing in the medium term if maintenance tasks were not performed regularly, namely staircases, roofs and upper storeys.

SOCIAL AND CULTURAL VARIABLES (E)

E1. Internal social variables: They refer to the processes that occur within the house in relation to the people that live in it, the structure of the family and any changes that might occur because of offspring moving out, children being born or extended family living in one house, as was observed in the modern mudbrick houses. This was also observed in the archaeological sample for example in the evidence from a census in Kahun which explained the changes in household members throughout time.

E2. External changes: These refer to the way that people living in a certain house are seen by other members of the community, and the status within the community brought about by that perception.

E3: Tradition: Tradition has proved to be an important element in modern mudbrick houses; the interviews undertaken during fieldwork express this continuity in building customs transmitted from generation to generation. Tradition is also linked to local development and the possibility of particular local traditions having an architectural correlate should also be considered.

E4. Superstition/religious beliefs: In the modern sample, superstition was seen to play a part on the presence and particularly on the position of certain house features.

Superstition and religious beliefs also have a cultural parallel in the history of ancient Egypt that we know from textual sources, therefore it is probable that they would have also had an influence on the houses. Evidence for domestic religious practices is significant in other non-mudbrick houses such as those at Deir el-Medina.

E5. Local idiosyncrasy/produce: Certain villages focus on a particular industry which in turn reflects on certain characteristics of their architecture, as was witnessed during the study of the modern mudbrick houses. In addition, there was a suggestion in the archaeological sample that other distinctive characteristics of a place, such as the presence of a particular type of rock, can also result in particular architectural features.

E6. Cultural meanings: Meanings can only be understood within the particular culture in which they are created. Some of these meanings have been presumably decoded through the combined study of ancient Egyptian texts and iconography. However, their reflection on architecture might not be as clearly decipherable; in addition, the existence of particular meanings specific to the domestic environment should also be considered.

E7. Ethnicity: Ethnicity may be expressed on distinct feature characteristics both in ancient and modern houses, for example, through the use of particular motifs.

E8. Class-specific cultural variables: It has been suggested through the analysis of the archaeological data sample that some cultural variables could be specific of a certain class and might not necessarily be shared by other social groups.

COMMUNITY AND INDIVIDUAL VARIABLES (F)

F1. Food distribution/supply: This community variable refers to the way in which the distribution of food would have been organised in ancient Egyptian settlements and the impact that this organization would have had on particular house features.

F2. Financial means: The financial factors have perhaps been given too much weight in the archaeological interpretation and should always be evaluated within the consideration of all other parameters; however, through the analysis of the modern houses it was identified that, in most cases, financial means affect the quality and degree of elaboration of the feature, although in the poorest or richest groups it might also determine the actual presence or absence of such feature. The archaeological sample suggests that this was also the case for the ancient houses examined.

F3. Personal preference: The study of the modern material has proved that the specifics of some architectural features are actually a matter of personal preference; this could also have been the case in the ancient houses. Although the archaeological method tends to look for common points in order to build hypotheses and therefore avoids personal preference, the quick distribution changes undertaken even in state-planned settlements are testimony of the importance of personal preference. Other features, such as security-related ones, also have an element of personal preference.

F4. Occupation (job): The archaeological sample suggests a possible correlation between certain house features and the work undertaken by the inhabitant of the house; this is also in connection with the concept of secondary role which will be outlined later. Nevertheless, occupation may be hard to distinguish from a series of activities characteristic of, for example, rural units.

SPACE ALTERATIONS (G)

G1. Room distribution: The way that rooms are distributed within a house is connected to many different variables, such as environmental (e.g. affects ventilation) and cultural factors.

G2. Access: Access modifications, materialised in the blocking of openings and position changes, are a common process in mudbrick houses. They exemplify the organic nature and flexibility of both ancient and modern houses, as evidenced in both samples.

G3. Room use/wear: It refers to marks which indicate the sort of activities undertaken in the room; similarly, it relates to the amount of traffic experienced in the room.

G4. Function/use: This distinction is one of the most important contributions to the study of space in modern mudbrick houses. It means that the function primarily given to each room when it is designed does not usually stay unaltered; consequently, the activities undertaken there can vary in different times of the day, of the year, and through a long period of time. This change throughout time in the activities performed in a specific space causes certain rooms to be demoted from their original functions and used for activities that allegedly require less detail and care, such as animal keeping and storage.

G5. Gender: Gender was a reason for space use alterations in the modern sample, with women and men undertaking certain activities in some places and not others depending on a number of factors, such as the presence of people alien to the household; nevertheless, those alterations did not always necessarily have a physical correlation. It has been previously suggested that certain areas of the ancient Egyptian house would have been reserved to women; while the exploration of the effects of gender on space has not been a focus of this study, it has been acknowledged as another factor to be taken into account.

G6. Public/private areas: This is an important distinction for houses in general and it was recorded in the modern sample, in which certain areas were not accessible to strangers. In addition, similarly to gender, it has played an important part in the interpretation of archaeological remains.

ACTIVITY AREAS (H)

The activity areas within this variable group were identified during the study of the modern houses and were then used to classify the information in the archaeological record. Courtyards were analysed separately because of the number of different activities that can take place in that space, as well as the importance that they had in previous archaeological interpretations.

INDIVIDUAL HOUSE CHARACTERISTICS (I)

I2. Orientation: The orientation of the house, which determines the areas that are hit by sun and the times of the day when this occurs, influences the position of certain features and the performance of certain activities. The archaeological sample appears to show such correlation at least in some cases.

I3. Secondary role: During the analysis of the archaeological remains, it was suggested that houses might perform a secondary role aside from that of serving as a place of residence. This could be related to the work occupation of the inhabitant.

I4: Structure: The number of floors in a house is difficult to identify in the archaeological record; however, it is an important detail as it has an influence in the rest of the house. Roof terraces were identified in the modern houses and they could explain certain characteristics of ancient house models and representations for which architectural evidence has not been found.

I5. Environmental conditions: Ventilation and light affect the internal conditions of the house, such as temperature, together with the activities that can be performed within it; these conditions are modified by the existence of various types of openings.

ARCHAEOLOGICAL VARIABLES (J)

This section outlines archaeological variables which might explain the absence of some features and which should be added to all previous considerations.

J1. Deposit formation: Certain characteristics associated with mudbrick houses can be misleading in the archaeological record; for example, the thick layers of deposits created as a result of repetitive maintenance of buildings can be mistaken for a sign of long occupation. In addition, it can be difficult to distinguish between the contents of a room, its fallen roof and any structures located above it.

J2. Similar remains: The identification of certain remains which have a similar aspect in the archaeological record can be problematic; walls can be mistaken for roof and ceiling fragments and vice versa; ceiling beams can also be mistaken for wooden beams which are sometimes found in the masonry of modern and ancient houses as structural reinforcement; the organic nature of these remains means that it is difficult to establish the original length and diameter, therefore complicating their identification further.

J3. Action of the elements: Erosion processes can cause the modification of certain features, for example the reduction of brick dimensions. This modification can lead to total disappearance. These erosion processes also occur in the medium term which is why regular maintenance is needed.

Section 3

This section provides a summary of possible factors behind variation within the same settlement and between different settlements (the explanation of these factors is given in section 2).

Within the same area:

- Economic reasons (see F2)
- Individual preference (see F3)
- Household characteristics (family structure) (see E1)
- Status of the owner within the community (see E2)
- Suitability of the house for main activity and possible secondary roles (see I3)

Between areas:

- Settlement location: as it influences local material availability.
- Climate suitability: as different climate conditions might encourage the presence of certain features.

These two factors also determine the degree to which the action of the elements has affected the archaeological remains.

- Hydrography and flood: as it influences the specifics of the local material available and can also encourage the presence of certain features.
- Land availability: as this might influence the number of extended or dense houses.
- Local tradition/idiosyncrasy: as it might result in particular architectural features being present or affect the specifics of common features.

5.4. Implications of the ethnoarchaeological study

5.4.1. Implication for previous sources of interpretation

Traditionally, previous interpretations of ancient Egyptian domestic architecture have used two main sources of data: artistic representations of houses and archaeological data from Amarna.

5.4.1.1. Artistic representations of houses

With respect to the artistic representations of houses, the research adopted a skeptical approach about their reliability as sources of information for the interpretation of ancient Egyptian domestic architecture. However, throughout the research, three instances have been highlighted in which models and representations appear to be reliable.

Firstly, the correspondence of the structure represented in the model of a granary from the tomb of Meketre, and the floor plan of the granary areas in the Kahun mansions (see Figs. 4.47 and 2.3), both consistent with interconnected rooms separated by low walls and accessible from above.

Secondly, the depiction of windows in Theban tomb representations of houses does not contradict the archaeological remains. Although there is little information available given the relatively low height of the wall remains preserved, the absence of windows at this low level fits in with house representations showing windows in the upper part of ground floors and in first floors, as opposed to close to the ground (see Fig 4.48).

Thirdly, some clay models represent superstructures built on the first floor (see Fig.1.2 top right). Although the evidence for this has not been found in the archaeological record, the presence of these superstructures corresponds to the roof terrace structure observed in modern houses; moreover, a Theban wall representation (Fig 4.48 c) showing a palisade built between two superstructures is consistent with the structure of a roof terrace.

5.4.4.2. Amarna

The sample studied within this research is not ample enough to be able to make conclusions regarding the degree to which Amarna houses are representative of ancient Egyptian domestic architecture. However, many architectural features in the sample are found exclusively in that site; that may be because the site as a whole has been better preserved or be due to the fact that it has been substantially more studied; nevertheless, the possibility that such architectural features were particular to Amarna cannot be ruled out. With regard to house plans, one of the aims of this research was to play down the importance of house plan typologies of the kind used in previous syntheses of ancient Egyptian domestic architecture, therefore plan correlations have not been formally explored.

Nevertheless, it is worth pointing out that there exists great diversity in house plans within the Amarna site, and that the standard Amarna villas are only one of multiple architectural solutions available within the site.

5.4.2. Implications for previous studies

As can be inferred from section 5.1., ancient Egyptian domestic architecture has featured in two types of studies: on one hand, formal studies whose main object was to compare and classify house plans; on the other hand, settlement studies which included domestic architecture as part of the urban fabric. This research has implications for both types of studies.

5.4.2.1. Formal studies

These studies, which have endured throughout the years (e.g. Ricke 1932, Tietze 1985 and 1986, Arnold 1989) focused mainly on house plan types and house sizes. In contrast, as mentioned before, this research has not focused on house plans; neither has it focused on house sizes per se, but rather in their relation with a series of contextual factors which include environment, sociocultural factors, community and individual factors. The research has concluded that all these factors may have an effect on the particular size and spatial arrangement of the house. These factors are not exclusive, despite the fact that certain ones may prevail over others in certain sites (e.g. topographic location, which might have a strong influence in house size possibilities). They must therefore be understood within the consideration of all other contextual circumstances; a corollary is that house comparison must be established within each settlement in the first instance.

5.4.2.2. Domestic architecture as part of urban fabric

These studies (most notably focused on Tell el-Daba and Amarna, see e.g. Bietak *et al* 2010) identified a series of dynamics at settlement level which are useful to understand urban society as a whole. This research has considered domestic architecture as an element that deserves specific study, recognising that settlement dynamics have a specific and distinctive influence in the house which deserves to be studied, and which manifests itself in particular ways. For example, the influence of environmental factors in the house has been studied before (Endruweit 1994, Spence 2004), concluding that they physically reflect in the orientation of the house, amongst other factors. However, this research has attempted to link those contextual factors to the human element and the actual practicalities of daily and cyclic living; for example, in Amarna, the prevailing wind has been seen to have an effect on the location of ovens which is consistent with drawing fumes away from the house; however, the presence of exceptions might be explained by seasonal cooking.

On the other hand, studies such as Samuel (1998 and 1999), focusing on bread making, or Kemp (1994) dealing with organization of food distribution, both of them at Amarna, are necessary to fully understand the dynamics of storage activities within the house. In this respect, this research has shown that the individual study of houses shows limitations in the understanding of aspects which strongly depend on overall site organization. Both dimensions therefore complement each other, thus must be studied simultaneously where possible and further links established for well-studied sites such as Tell el-Daba; however, as this information is not available for many sites which do have domestic architecture remains, the kind of study of activities in individual houses undertaken in this research, can at least provide some indication of the importance of these activities and offer clues as to the overall site organization.

5.4.3. Implications for the archaeological record

The recording and interpretation of domestic remains is problematic, mainly with regards to courtyards, upper storeys and the identification of building phases.

5.4.3.1. Courtyards

As explained in chapter 2, courtyards constitute the fundamental element of one of the house types previously established. Nevertheless, courtyards are broadly defined especially in relation to their position, which this research has demonstrated need not be central. This in itself prevents their practical use as a typological element.

In fact, the very identification of these courtyards in the archaeological record is not certain. This research has shown that organically roofed rooms can be mistaken for courtyards if an accurate recording of the organic material is not carried out. In addition, this research has also identified further clues which can help identify whether rooms would have been actually roofed, such as the spanning capability of beams, and the correlation with the type of activities performed within the space, for example, cooking might benefit from an open space.

5.4.3.2. Upper storeys

One of the main practical contributions of the study of modern mudbrick houses has been that of identifying the roof terrace as the most common arrangement for upper storey areas. As has been described in section 5.4.1.1., the roof terrace has a correlation in some clay models and tomb representations.

A roof terrace is formed when certain areas of the ground floor roof are built upon, while others are not. The archaeological implications are that deposits thick enough to suggest the presence of upper storeys may only feature in some areas. The likelihood of such walls being thinner and the implications for the identification of such deposits must also be taken into account. This provides further evidence for previous research which suggested various upper storey arrangements by focusing on architectural rules concerning, for example, ventilation (Spence 2004).

5.4.3.3. Building phases and diachronic evolution of the house

Building phases can frequently obscure the identification of domestic remains, often because of the difficulty of singling them out. This research has identified multiple levels in the processes that lead to successive building phases, concluding that these do not only occur in the long term, but also within substantially short periods of time, including within the year cycle. The consequence of these short term changes is that multiple building phases can correspond not only to a same period, but also to occupancy by a same household group. A further identification of this research was that of parallel processes such as the secondary use of structures following their abandonment as main residences. A parallel for this secondary use may be found in Bietak's (1994) suggestion of Tell el-Daba houses as the origin of private chapels.

While multiple building phases can be difficult to detect, exploring the reasons behind their existence would provide elements for their identification, helping explain contradictions or absences in the archaeological record. Their identification is, in any case, essential for the correct interpretation of domestic remains and adds a further dimension to the investigation of the contextual levels described.

5.4.3.4. Surrounding house space

The analysis of modern mudbrick houses revealed certain elements, such as mud benches and storage containers, which were situated outside the house walls but formed part of its space. The archaeological recording of these structures is necessary not only for the complete understanding of the house, but also for the understanding of the transitional spaces between private and public areas which serve to establish the connection between the family environment and the community space.

5.4.3.5. The importance of mud as a building material

Mud is the building material of domestic architecture across ancient Egyptian periods and sites. The fact that it transcends social classes is a test against the usual assumptions of archaeology, where material is often a prime element of differentiation; the logical consequence is that those differences must be expressed through other means, therefore those differences may be behind variety in architectural feature details, and perhaps distribution and use of space. On the other hand, the almost ubiquitous mud adds to the importance of studying domestic architecture separately, independent of temples or palaces; it also discourages the establishment of parallelisms between such architectures, which have different aims. Finally, it raises the question of what cultural determinants are responsible for establishing the boundary between the properties of a material e.g. in this case the infinite flexibility of mud, and the extent to which those properties are taken advantage of, thus realising that flexibility. The determination of that boundary, although extremely difficult, would surely provide an interesting insight into a society.

5.3. Contributions and limitations

Section 5.2. indicated how the completion of each one of the sub-aims and objectives had contributed to the research as a whole. However, there are other contributions made by the research which transcend the boundaries of its main topic.

5.3.1. Contributions and limitations of the research data

5.3.1.1. Modern data

5.3.1.1.2. General contribution

The methods used were borrowed from anthropology and architecture as well as archaeology, and consequently have produced information relevant for those three sciences.

The contribution of the data collection was primarily towards ethnography. Information about the changes and development of modern Egyptian mudbrick houses had previously only been marginally collected.

As part of the research, individual fieldwork, including architectural surveys and original interviews with house owners, was undertaken in areas where no previous studies of mudbrick houses had ever been carried out, such as the chosen locations in the northwest Delta. This contribution is amplified by the fact that these houses are rapidly disappearing in recent years and that the data available has substantially diminished in the time between the data collection and the conclusion of this research.

A further contribution of this research was that of compiling published sets of ethnographic data regarding modern mudbrick houses. In addition, those sets of data were used towards an understanding of ancient Egyptian mudbrick houses, something for which they had not been used before whether individually or collectively, even in the case of the Hassan Fathy archive.

As to the information from other data sets, these were drawn from published sources, as well as from Hassan Fathy's personal collection. There is disparity in the information contained in each one of them, which corresponds to the reasons behind each of their publications. The publication by Lozach and Hug (1930) contains a large amount of detail regarding the physical characteristics of houses in Lower and Upper Egypt. It included some schematic house plans with room function labels, but lacked architectural surveys as such. The book focused instead on social geography, and provided interesting reflections on the relation between environment and house distribution. It also contained first-hand information through the inclusion of questionnaires which were handed out to people in rural areas. On the other hand, some of the assumptions made by the authors, particularly regarding economic means and their influence, might be tainted with prejudice.

Eigner's (1984) publication was written from an architectural point of view, and provided a useful synthesis of the similarities and differences in a planned settlement, as well as an objective description of the distribution and use of space.

With regards sources concerning Upper Egypt, Henein's (1988) study of Mari Girgis and Castel's (1984) study of a house in Qurnet Marei were both written from an ethnographic point of view; therefore provide a wealth of information regarding the social and cultural element involved in houses, as well as providing detailed plans of houses. In the case of Henein, houses are treated as just one aspect of culture and therefore the amount of house plans provided is limited; however there is a detailed description of architectural features. On the other hand, Castel's (1984) survey only refers to one house, but it is extremely useful in providing an insight on the social and family dynamics which cause short and long term alterations in the house. The plan also was useful in showing the adaptation to the surrounding topography, i.e. the hill and the ancient tombs carved into it.

Lastly, the unpublished plans in Hassan Fathy's collection contained a wealth of information regarding room contents, as well as a number of plans showing the diversity of houses developed organically. The disadvantage of this data was that plans were not to scale and that architectural features were not described in detail. In spite of this, the plans were useful in showing the variability in floor plans. Once the connection between the room content description and the plans was established, they also provided useful information on the distribution and use of space within these houses.

In all cases, the samples refer to rural areas, where mud is the main building material as opposed to urban areas; in the case of the archaeological sample, most of the remains included refer to urban environments; however, mud was the building material shared by rural and urban areas. Moreover, in terms of size, ancient Egyptian cities may be more comparable to modern villages.

Although the amount of house plans for the Dakhleh Oasis is limited, domestic architecture there is well known, thanks to the presence of a multidisciplinary project. Architecture is very distinctive, due most likely to isolation and preservation laws; this facilitates the identification of common architectural features within this area and any variants within the region, which points at the cultural homogeneity of this area.

As well as recording the fast disappearing traditional architecture of Egypt, the general contribution of the comparative study performed between these sets of data was that of giving an overview of the differences between modern mudbrick houses across different areas, something which had not been done previously.

Due to the differences in the amount of data, some areas might be better understood; in addition, diversity within areas might be missed because of the limited amount of locations within each area.

5.3.1.1.3. Limitations

The limitations of published data sets have already been described. With regards the original fieldwork undertaken for this data, a first limitation is that naturally given by the amount of mudbrick houses that had survived in the Delta when the data was collected, an already small number which has decreased since this research started. On the other hand, the number of houses preserved in the Nile valley is much higher, which means that there is a natural disparity in the amount of data than can be collected. A consequence of the progressive substitution of Delta houses for red brick and concrete alternatives is that some of the old mudbrick houses are given a secondary use as stables or are used for storage. Although these houses might not be fully functional, their study and inclusion within the data set is interesting because it illustrates the processes that occur once houses are abandoned as first residence or when they are use as co-residencies. This kind of reuse and abandonment phases are difficult to interpret in the archaeological record, so the recognition of this phase of use provides another possible phase in understanding the mud brick houses excavated, as mentioned in section 5.4.3.3. In addition, the study of the modern houses illustrates the demoting of rooms, an important process observed in mudbrick houses whereby certain rooms pass, for example, from being bedrooms to being used for animal keeping or storage; consequently, it also informs about the physical changes that follow that change in use. Lastly, the inclusion of those houses helped to confirm that building material was an element of social differentiation, which entailed that, where the material was the same – as in the ancient Egyptian houses – that differentiation would need to be expressed in a different manner.

Aside from availability, from an ethnographic point of view the data collection was constrained by the impossibility of spending long periods of time living within the house, which would have offered independent confirmation of the information obtained through interviews. Observation of the use of space would have therefore benefited from longer periods of research.

The number of houses fully surveyed was limited; however, the interview information provided clear lines of research about the contextual factors that affected the house. The number of houses surveyed and observed provided enough information to be able to identify a series of categories of architectural features commonly found in these houses. There was a sense that further surveying would have increased the range of individual solutions; while this would have highlighted more the importance of such individual factors and choices – which have in any case been given a specific category- it seems unlikely that it would have added more essential elements of comparison.

The limitations for establishing conclusions regarding environmental and geographical differences come from the existence of other areas which were not studied, particularly the northeast Delta and Nubia and Aswan (Upper Egypt). The architectural tradition in the last two areas includes the use of vaulted roofs, which rarely feature in other parts of Egypt but which are known to have existed in ancient Egypt; on the other hand, this architecture shows distinct characteristics which separate it from the rest of the country. For this reason it might be problematic to include this data alongside that of the other areas, but it also suggests that the weight of cultural factors can impose itself over environmental adaptation and result in different architectural solutions.

5.3.1.2. Archaeological data

5.3.1.2.1. General contribution

The archaeological data set included had never been compared before. Specific comparisons of houses between certain sites included within this sample had been carried out, particularly between Kahun and Amarna, as has been reiterated.

However, a broad comparison across periods and areas had never been undertaken; neither had a holistic comparison taken place which took into account both context and material. Lastly, an ethnoarchaeological study of Egyptian mudbrick houses had never been previously attempted.

5.3.1.2.2. Limitations

Limitations were caused by the sites and periods included, which in turn were determined by the availability of data. A further limitation for the comparison was the quality of the description provided in the various excavation reports.

Lastly, due to the wide scope of the research both geographically and chronologically, it was not possible to include all houses in each settlement.

5.3.2. Contributions and limitations of the methodology

5.3.2.1. General contribution

The main contribution of the research was providing a new set of interpretative tools and methodology for the study of ancient Egyptian mudbrick houses, since one had not been produced to date. In addition, the specific aim with which that methodology was developed was that of producing a standardised method of analysis and interpretation, which adopted a broader approach that allowed comparison across sites and periods without resorting to the use of typologies.

5.3.2.2. Limitations

The amount of relations that could be established between context and materials is potentially endless; in addition, as was explained in section 5.3., relations between context and material are reflected physically to different degrees, and in some cases, the amount of variables can be much larger than in others. Consequently, a simplifying process needed to be carried out in order to be able to summarise that information and provide a practical tool.

5.3.3. Contributions of the theoretical approach

One of the main contributions to the research was a theoretical approach which looked into the subject of ancient Egyptian domestic architecture from a broader perspective than previously attempted. This approach included a consideration of interaction factors between humans and buildings and of contextual factors that affect the house, as well as an analysis of the way in which both groups of factors reflect onto the materials and physical structure of the house.

While previous research on ancient Egyptian domestic architecture had focused fundamentally on isolated aspects, such as climate or status, this approach attempted to unite a wide range of factors and to explore the links between them.

A key assumption upon which the discourse about ancient Egyptian houses was built was the existence of types to which houses conform. However, these types were not developed within the consideration of their context but purely on a formal basis, which necessarily implied that a broader approach had to challenge these categories. A contribution of the research was, therefore, the development of a method of analysis which did not rely mainly on formal aspects. The compilation of previous archaeological literature has shown that planned houses are rapidly modified by their inhabitants to suit their particular needs; similarly, these needs mark the development of organic houses. In both cases, house plans are progressively altered; hence the archaeological remains are likely to represent the final phase of those changes, although in some cases previous phases might be identifiable. The further contribution of the research, which argues against the use of a house typology as a tool for comparison, is that such 'final form' recording would discourage the use of plan types as an element of comparison between houses.

This traditional classification of houses into types was presumably done in order to facilitate comparison. However, the exclusion of house types does not imply a lack of comparable elements; instead, the methodology developed within this research made use of environmental, sociocultural, community and individual factors as a basis for comparison between houses within the same and across different settlements. In fact, this methodology allowed the comparison to be taken further, as its inclusion of a wide range of factors and its non-reliance on the conformity to specific house plans enabled the consideration of house remains regardless of the degree and quality of preservation of those remains.

Therefore, the contribution of a broader theoretical approach was to allow an independent analysis of each house which was not reliant on a comparison with others, while at the same time providing an alternative method of analysis which facilitated that comparison *a posteriori*.

As a consequence, this research further contributed to the understanding of ancient Egyptian houses by providing an insight onto the macro and micro dimensions in which the house is embedded.

A broad theoretical approach also allowed a re-evaluation of previously assumed correlations between house types and architectural features and social class, as well as those relating to the use of space. It encouraged an analysis of contextual and material factors which might come together to explain the presence of certain architectural features; in that manner, the range of interpretations went further than the traditional associations assumed or established by previous interpretations, to include environmental, human and practical aspects.

5.3.3.1. Limitations

An aspect of domestic architecture which the research has not considered is the existence of symbolical meanings associated to whole or parts of houses. Symbolic space was initially identified within the interaction factors (Chapter 2). In addition, superstition and beliefs were included within the individual factors of the interpretative tool (see section 5.3.); however, the existence of a socially shared symbolical meaning of the house was not explored in detail. One of the main reasons behind this omission is that, while superstition/beliefs might have a clearer, specific physical reflection –helped in many cases by our familiarity with certain ancient Egyptian symbols and by the parallelisms suggested by the modern houses- the symbolism associated with the house as a whole would be much harder to detect physically. This symbolism exists through the individual and collective perception and might be manifestly expressed through, for example, texts, which have not been included in the analysis. It is that perception that gives value to the symbolism more than the physical expression itself. It would be extremely hard to identify this aspect by exclusively using the archaeological evidence, as it is the case in this research, which means there is a higher risk of imposing our own assumptions.

Therefore, because this research introduces a new method for recording, analysing and interpreting archaeological remains, it is believed that the symbolic aspect could not be explored before those bases are established and that other source types would be needed in order to assess this properly.

5.4. Conclusion

This chapter has outlined the reasons behind the development of new interpretative tools by the research, presented them and evaluated them. It has also detailed the implications of the research for previous sources, studies and most importantly, the practical implications for the interpretation of certain problematic aspects of the archaeological record.

The contributions of the data set, the methodology and the theoretical approach have been outlined, while acknowledging that there are certain limitations in all aspects which the research could not cover. Based on these limitations, a series of recommendations for future work have been produced which will be presented in the final chapter.

Chapter 6: Conclusions: Towards a holistic understanding of ancient Egyptian domestic architecture

6.0. Reflection

The research has advanced the field of ancient Egyptian architecture thanks to the development of a methodology which can be used henceforth to analyse all excavated remains in a standardised manner; in addition, the interpretative tool facilitates the interpretation of the remains recorded thanks to a broader understanding of the processes involved in their formation. Furthermore, the standardisation encouraged by the tool means that a comparison between any site and period is facilitated, therefore also contributing to the advancement of the general discourse about ancient Egyptian houses.

The analysis of a sample from varied sites and periods has put the traditional primacy of the Amarna data in previous interpretations into perspective by revealing a large amount of variety in architectural solutions across sites and periods. Moreover, this research has also challenged the use of typologies for the interpretation of ancient Egyptian houses by questioning the bases upon which those house types were developed.

To the revision of concepts central to previous interpretations, new concepts have been added; chiefly, the research has shown a new dimension of the importance of context, an essential concept in modern archaeology that has nevertheless never been applied to the study of archaeological remains of houses. By revalorising the role of mud as a material and considering its flexible properties, this research has also developed alternative interpretations for some spaces in the archaeological record.

The convenience of establishing social differentiation from domestic architecture has been challenged on the basis that the way in which this differentiation is expressed within the settlement must be understood within the context of the settlement before it can be compared to other sites. With regards the correlations between building material and economic capability, this research has shown that, while a direct correlation exists in some cases, it can only be fully understood by considering all the other operating contextual factors; most importantly, the social groups present in the settlement.

6.1. Recommendations

Based on the analysis of the contributions and limitations developed in chapter 5, a number of recommendations have been developed; a first group refers to the application of the new methodology in the future; secondly, recommendations are given as to ways in which the research can be expanded by pursuing both theoretical avenues which the research could not cover and other relevant areas that the research has highlighted.

6.2.1. Recommendations for the application of the methodology

In order to understand the diachronic evolution of the settlement, the recommendation would be that the methodology is applied to the houses encountered in each phase – wherever distinction of these phases is possible. This would be done by trying to establish links between the variations in specific contextual levels and changes in the physical structure of the house (although at least some of those contextual levels should presumably remain constant within a same settlement).

Similarly, the methodology should ideally be tested for all houses in each existing site in order to provide a corpus of information that can then be used for comparison.

One of the strengths of the interpretative tool is that it does not intend to be static, but rather provide the foundations for its further development in view of the results of its practical application to sites.

Equally, the broad consideration made by the research of the nature of the relation between humans and buildings and its consideration of contextual and material factors alike would potentially allow its application to other cultures with mudbrick houses. Further research prompted by an attempt to apply this methodology to other samples might result in the modification of the factors included or in the identification of other sub-categories to be added to the contextual factors, according to the amount of information available for the culture in question. In any case, the interpretative tool would provide the skeleton for the recording of architectural responses and material correlations to such contextual factors.

6.2.2. Recommendations for expanding the research

6.2.2.1. Integrating house and settlement studies

From the approach adopted by this research, it can be said that the house belongs within two spheres, a macro and a micro dimension. For the study of ancient Egyptian houses, the macro dimension is represented by urbanism/settlement studies, and deals with the house in as far as it is another tool to understand the relations established within the town or city, which can provide information on issues such as production, organization, supply and self-sufficiency; on the other hand, a micro dimension represents the particular characteristics of a household, which have traditionally been studied in terms of size and, later on, of status and climate. However, as mentioned in chapter 1 and 5, while the study of settlements has advanced in the past decades towards incorporating environmental and social aspects amongst others, the foundations underlying the understanding of domestic architecture in ancient Egypt have not changed.

This research aimed to begin to bridge the gap caused by that dichotomy by considering the macro conditions into which the house is inserted, while analysing the micro dimension of the house – the material physical aspects, including the particular architectural features, the changing processes experienced, the activities undertaken and the use of space – in relation to that macro dimension of the settlement and of the wider historical and geographical context. Settlement studies consider palaces, temples and houses as main structures of a community; in that context, a micro approach might be seen as taking the house out of the settlement study; however, by providing a specific analysis of the house its role as an element for the understanding of the settlement is strengthened. Nevertheless, such role requires further investigation; equally, the two dimensions should be explored together wherever possible.

This research has defended that the house should be studied as an entity in its own right and consequently, an understanding of the house by itself needs to be reached in the first instance; however, this understanding is incomplete without its insertion into the macro dimension to which it belongs. Therefore, a recommendation for future work is that the advancements in the knowledge of ancient Egyptian houses brought about by the type of research here presented are integrated into the findings of settlement studies; a corollary of this is that the general discourse about ancient Egyptian houses must be built upon this holistic understanding.

6.2.2.2. Symbolism of the house

In section 5.3.3.1, the reasons why the symbolism of the house was not considered as part of this research were explained. Nevertheless, this is an aspect which could be further explored by relating the analysis carried out by this research with indirect expressions of the relationship between house and people which were not included in this research, such as textual material, artistic representations or artefacts in 'sealed' contexts, which rarely survive.

The research suggested that artistic representations of houses of the Middle Kingdom may be in fact reliable sources of information; this raises the question of whether this would also be the case for other periods or this presumed realism is a peculiarity of the Middle Kingdom. The issue of how to interpret certain representations still remains; however, further research into archaeological remains prompted by the kind of research here presented may throw some light into this relationship. A further understanding of such inconsistencies may prompt research lines upon which to base an investigation of the symbolism of the house.

The recommendation in any case would be that these complementary sources are further studied only once an understanding of the archaeological evidence has been achieved through the application of the interpretative tool developed. This application would provide an understanding of real space; once that has been achieved, an understanding of perceived space, such as iconic space (Tanner 1991, 22) may be attempted.

6.2.2.3. Material production

This research has aimed to provide some clues to understand how material choices are made at various levels and the degree of influence that each one of those levels can have, from global power structures, to local powers, community relations and organization and individual decision control. Further research into those levels could perhaps prompt a revision of assumptions in the way in which the relation between material and the human factor is established in archaeology.

Furthermore, this research considered individual preference as another link of the material choice chain, which is often neglected due to the difficulties to identify it in the archaeological record; this opens the door to further investigation into the choices of ordinary people who are rarely the subject of textual sources.

6.3. … Towards a holistic understanding of ancient Egyptian domestic architecture

This thesis stemmed from a desire to give a vision of houses much more connected to the humans living in them, their choices and desires, and ultimately the personal and individual imprint put into them. It aimed to see in the house plans much more than a set of geometrical patterns and to reinstate them instead as ever-changing dynamic forms, moulded to reflect the vicissitudes that characterise the life of any individual and that transcend the boundaries of periods and cultures.

Throughout the process, the complexity that characterises the manner in which humans modify their environment and the material forms into which this modification translates, was unveiled. The house material, ancient and modern, demonstrated its role as the canvas on which environmental, social, cultural, individual and a myriad of other influences within them, are captured; this is after all the essence of the insight into other cultures archaeologists expect to gain from the study of ancient remains. Humans ‘live’ in caves, tents, houses; thus these capture everything that is to do with being alive: the establishment of relations with the world and with others.

This thesis therefore chose an ethnoarchaeological study of mudbrick houses to emphasise the universal importance of a holistic approach to domestic architecture. It attempted, firstly, to propose a reflection on the way that studies of ancient Egyptian domestic architecture have been undertaken to date; secondly, to suggest a change of focus and to articulate such change into a new theoretical and methodological approach. Through this pause on the way, a number of tools were collected in the path towards a holistic understanding of ancient Egyptian domestic architecture.

There remains a long road ahead with many unknowns to be faced yet, but it is hoped that this research has offered some concrete indications as to the shape that such path may take in the future.

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Appendix – Document 1: The traditional Arab house vs. the rural Egyptian mudbrick house: influences in the interpretation of the archaeological remains

Archaeologists have tried to turn to a comparison with modern structures to attempt a more complete understanding of the archaeological remains.

The lack of familiarity with sociocultural aspects of domestic life in ancient Egypt, together with the wave of Orientalism towards the end of the 19th century, drove the first researchers to heavily rely on the traditional Arab house to explain and interpret the archaeological remains. For example, Steindorff (1896, 108) referred to the *salamlik* - a term generally used in Islamic architecture to refer to guests and men's quarters (El Guindi, 1999)- to explain the tripartite core structure of the Kahun mansions.

The relative knowledge and familiarity with the so-called traditional Egyptian architecture had originated in publications such as Edward Lane's 'Manners and customs of the modern Egyptians' (1836), one of the earliest ethnographic accounts of Egypt which would be used thereafter as the Western reference of Egyptian domestic life (Chowdhury 2010, 31). In his description, Lane presented the internal court as the central element of the Cairene house (Chowdhury 2010, 33). He portrayed the courtyard house as representative of all houses in Egypt, and to a large extent, the entire Muslim world (Chowdhury 2010, 31), an interpretation that was to be perpetuated in later works in the West (Chowdhury 2010, 41). However, while he described these wealthy homes at length, he paid very little attention to the homes of middle and lower classes, which he described as 'mere hovels' (Chowdhury 2010, 34).

The courtyard house is nevertheless a much extended traditional model in the Islamic world. The original idea of the courtyard house as the ideal Islamic house had its origin in the description of the Prophet Mohammed's house, which is documented to have had as main element a square courtyard with a front peristyle of two rows of palm tree trunks. In front of this, there was a porticoed entrance for the purpose of receiving guests. Most of the enclosure was occupied by the women's areas or *harim,* formed by individual small rooms (Gazzard 1986,16). Later, this model also developed vertically due to the lack of space in urban areas, for example, in Southern Arabia, 'tower houses' were established, where storage, animals and servants were located on the ground floor, with the women's apartments placed above and the men's quarters at the top. The highest section of the house was a 'penthouse' reserved for social interaction (Gazzard 1986, 17).

The ideal characteristics of the traditional Arab house respond to a series of cultural traditions associated with the Arabs as an ethnic group; in addition, despite Arab houses being different in various parts of the world, Islam acts as a unifying cultural force between the vast majority of them (Gazzard 1986, 16).

There are certain characteristics which theoretically define the traditional Arab house:

1) The physical separation between the public and private spheres of life, the transition between which must be done progressively (Gazzard 1986, 20). This separation is nevertheless compatible with a strong sense of hospitality - a characteristic of the Arab culture - and highly codified rules, such as a very well structured system of reciprocate visits (Al-Shahi 1986, 25). This strong sense of hospitality is reflected in the ubiquitous presence of one or several reception rooms. The separation between public and private areas usually materialises on a screen wall behind the main door, which prevents the direct view of the courtyard (Gazzard 1986, 23).

2) Gender segregation reflects on the provision of certain areas where women are protected from the sight of strangers, i.e. *harim* or women's apartments (Gazzard 1986, 23). However, this segregation would appear to have been originally devised as a response to an external 'intrusion', as opposed to being a self-imposed internal

organization pattern of the household. This seems to be exemplified by the fact that movement of house members between female and male areas is generally unrestricted, but women must retreat to their quarters if a stranger comes into the house (Al-Shahi 1986, 26). With this purpose, a series of social codes are put into effect, for example, long and loud greetings so that women have time to retreat to the reserved private areas that are barred to strangers (Reynolds 1994, 168).

3) The house is conceived both as a place to welcome and as a religious place (Gazzard 1986, 23) with a sacred dimension that transcends the idea of the house as a simple shelter, as stated in the Holy Quran: ‘Those who believe and do good works, them verily we shall house in lofty dwellings of the Garden underneath which rivers flow’ (Surat Al-`Ankabūt 29-58); ‘My Lord, build for me near You a house in Paradise (...)’ (Surat At-Taĥrīm 66:11); hence the ideal house aspires to be a reflection of that which could be achieved in paradise (Lehrman, 1980).

4) As mentioned, the courtyard is usually conceived as a central piece of the house. The reasons for these are manifold; practical reasons, such as the provision of circulating ventilation in which the courtyard has a central role, as well as the procurement of natural light and protection from dust; social reasons, providing an area where women can do their chores –most of the day in the shade, away from the sight of strangers and where the warmth of the sun can be enjoyed in the winter (Al-Azzawi 1986, 55). To this, economic reasons in certain areas must be added; for example in Baghdad, where the scarcity of land and its consequent high price turned the courtyard house into a convenient solution, as it required less land (Al-Azzawi 1986, 56). The courtyard structure also provides structural support and improved security to all houses as these are traditionally built contiguously (Al-Azzawi 1986, 56).

This courtyard can occupy a single storey or several storeys. For example, in Baghdad, the majority of traditional houses have a two-storey high courtyard, which can be between 6.60 and 9m high (Al-Azzawi 1986, 54).

All of these factors have a determining effect on space distribution and room function and use. The archaeological relevance of this is that wealthy courtyard houses would have been used as a source of parallelisms for the interpretation of ancient archaeological remains, and could have potentially had an influence in the interpretation, e.g. the search for the courtyard as a structural element of the ancient Egyptian house and the attribution of certain areas of the house to different genders or functions. However, there is no archaeological evidence excluding the possible existence of alternative models to the modern-influenced division between private and public spheres (Meskell 1998, 218). In addition, presupposed notions of global gender divisions, based on the ancient palace structure and, indeed, on the archetypical Islamic house, appear to be at least partially disproved by material evidence. For example, the presence of female areas in the front section of Deir el-Medina houses (Meskell 1998, 219), contradicting the generic relegation of women to the rear areas of the house.

A third source of complementary information are modern rural Egyptian mudbrick houses, studied as part of this research. While the vast majority of traditional courtyard houses are not built with mudbrick, the rural Egyptian mudbrick houses appear to share with the ancient ones not only the materials, but also some external characteristics. Modern Egyptian mudbrick houses have been used previously to interpret ancient ones. Davies described the similarities between the palisade of reeds depicted on the roof of TT 254 and those of the mud houses he had seen in the streets of el-Kharga (Davies 1929, 246). Similarly, Winifred Blackman devoted the last chapter of her book ‘The fellahin of Upper Egypt’ (originally published in 1927) to draw parallels between the ethnographic data she had collected in contemporary rural Egypt and ancient Egyptian objects and representations known to her time (Blackman 2000, 280-316).

However, while the comparison drawn with the traditional Arab house focused on the internal space distribution and use, the parallels drawn with the rural mudbrick house were mostly centred on the materials and external aspect. As a matter of fact, a comparison of the inner distribution of rural mudbrick houses with ancient examples is lacking (for notable exceptions, see Lacovara 1997, 64, Eigner 2006 and indirectly, Kemp 2006, 199, 200).

Therefore, it would be convenient to investigate to what extent the inner distribution of the mudbrick house follows or not the internal structure of the ideal courtyard Arab house and to what extent the values associated with the latter are represented in the former. Moreover, since the majority of the rural mudbrick houses theoretically fit under the umbrella of both Arab and Islamic houses, the comparison will serve to understand the relation between particular housing solutions – mudbrick houses in the Egyptian countryside and the ideal prototype of the Arab house, with its roots in the Prophet's house (Gazzard 1986, 16) and associated to a certain social behaviour which Quranic precepts directly make reference to (Reynolds 1994, 174). The archaeological relevance of such a comparison is in the understanding of the relation between culturally-developed housing ideals and practical applications of such prototypes.

1) Private and public area separation in many Egyptian rural mudbrick houses is hardly noticeable physically.

2) Domestic gender segregation can be, in practice, more lax than expected or vary depending on the circumstances.

3) The question of whether the mudbrick house has a symbolic dimension –such as the religious significance attributed to the traditional Arab house- beyond that of serving as a shelter, is difficult to ascertain. In Lozach's opinion, the mudbrick house was a mere shelter, given that working activities were carried out mostly in the fields, and any other activities took place in open public areas (Lozach 1930, 31). Since life was centred on agricultural production, the house was used as another agricultural resource: it served mainly as an animal pen and as a storehouse (Lozach 1930, 31). Regardless of whether there exists a further, symbolic dimension to the mudbrick houses, it appears that this practical function remains important; in Lower Egypt villages, where most mudbrick houses have been replaced by red brick and concrete houses, owners of previous mudbrick houses have kept them for two fundamental functions: to keep animals, and for storage. Apart from the infeasibility of keeping animals in redbrick houses or apartments, this seems to point at the two functions to which the mud house was traditionally associated.

4) The courtyard does not appear to be a ubiquitous feature in the mudbrick house, as will be later detailed in the analysis of modern mudbrick houses across three different areas of Egypt. In all three-areas researched there were multiple examples of yards which did not provide access to several rooms.

No examples of courtyards that were more than one-storey high were found in any of the three areas; in contrast, several-storey high courtyards, with rooms –sometimes with balconies- looking inwards, are a common feature in the traditional Arab house (Al-Azzawi 1986, 54; Makiya 1986, 10).

It would appear that, although some of the ideal characteristics and theoretical principles involved in the appearance of the Arab house are found in rural mudbrick houses, the particular architectural solutions into which these principles are translated do not fully correspond to those of the traditional Arab house, and the adoption of ideal principles might be much more lax in practice. In addition, these principles might not materialise in a different space arrangement and therefore might not have a physical impact; an implication of this is that the series of social relations negotiated around the house do not necessarily leave a physical trace or might actually produce contradictory physical evidence.

Perhaps practical factors have a more influential role in the design of rural mudbrick houses, and this might modify the definition of the role of certain features taken for granted, both in modern houses and archaeological examples, such as the courtyard.

Appendix – Document 2: Information on the theoretical and methodological contributions researched for chapter 2

Relevant theoretical contributions

Phenomenology and architectural anthropology

The process by which man modifies the environment by different means - the act of building being one of them - is studied by Phenomenology. Phenomenology as a philosophical trend was born of Edmond Husserl's will to identify the structure of consciousness in order to study the individual's experiences, which were responsible for the meanings that each person assigned to things[4].

Norberg-Schulz expressed its concerns about Phenomenology being too abstract and sugested it should be applied to the built environment and concentrate on the concrete features that characterised the construction of a place (Norberg-Schulz 1980, 8).

The idea of creation, i.e. of a place, is at the philosophical basis of Phenomenology. Heidegger, whose postulates became the foundation for many Phenomenology of landscape theories (Norberg-Schulz 1980, 9; Mugerauer 1993, 103) conceived architecture essentially as creation, 'the first skill'; in the same way that God created the world, mankind had received the ability to create in the world. Therefore, the aim of architecture was to establish an adequate relation between nature and people, in which the people's sense of sacred played a fundamental role. Consequently, the reason behind building was also concerned with establishing a spiritual order (Harries 1993, 51). People and nature were equally important in this creation, and the role of architecture was to establish a sacred relation between the two.

[4] Stanford Encyclopaedia of Philosophy http://plato.stanford.edu/entries/phenomenology/

The application of Phenomenology to architecture was influenced by social psychology (Egenter 1992, 149). Egenter (1992, 147) criticised that this resulted in inadequate city architectures since the end of the sixties and pointed out that their complex relation with the individuals should be analysed properly by science.

These criticisms also influenced the field of Art History and contributed to the development of the ‘Theory of Architecture’. A further consequence of the appearance of a Theory of Architecture was the introduction of the concept of ‘Architectural Anthropology’ which was first developed by art historians and then developed into a discipline of its own with a more practical orientation (Egenter 1992, 37).

Architectural Anthropology was defined as ‘anthropologically-orientated synchronic and diacronic research on the building activities and processes of construction that produce human settlements, dwellings and other buildings and built environments’ (Amerlinck 2001, 3).

Egenter (1982, 83) took architectural anthropology further believing that this reconstruction of a history of spatial behaviour might lead to an explanation of the genetic origin of certain cultural characteristics. This stemmed from the idea that buildings have a fundamental role in structuring space, and that humans reproduce that structure in other contexts (Egenter 1982, 83). He divided architecture into a series of stages with a certain prototype which corresponded to different cultural developments that characterised certain species, from Dryopithecus to Homo Sapiens Sapiens (Egenter, 2001).

Architectural psychology

Another consequence of the criticisms towards social psychology was the development of architectural psychology, a branch of psychology specialised in studying how different factors affect the individual’s perception and experience of buildings and consequently his behaviour in and around them. While, in the decades before, building design was exclusively the realm of architects who took it upon themselves to produce the most optimum design for the needs of an individual or a community, in the 1970s the focus started to move towards the client — the future inhabitant of the building. This new attitude was evident both in the development of the design concept and in the actual design and building process. The former started being influenced by experiments and studies which aimed to understand the individual's behaviour within a closed space/built area, within a specific community and finally within the public and private spaces provided in this community. The latter, was influenced by new strategies based on the methods of the social sciences (Appleyard 1973, 89) which were devised for public involvement through questionnaires, interviews and other feedback methods.

The object of architectural psychology was to develop a theoretically-based understanding of the relation between people and buildings, bearing in mind that human needs were not static (Canter 1971, 3; Joiner, 1971). However, architectural psychology's interest in the relation between a building and its inhabitant/s had a practical aim, seeking to improve current and future building designs by identifying the psychological aspects that have an influence on human perception of buildings and therefore an impact on the level of adaptation to a building.

The analysis of these factors was carried out mainly through experiments, although it is important to point out that this literature almost exclusively focused on western architecture – and therefore on western culture. A natural consequence is that this research was concerned with the influence that its findings could have in building design. However, one of the problems when trying to apply conclusions extracted from this empirical research in the form of experiments to architecture, was the fact that 'researchers' (here referred to individuals who were not directly involved in designing, but whose studies touched on aspects associated to architecture in some manner) and 'professionals' (here referred to architects or those who were directly involved in the building design process) were two worlds apart, that hardly communicated or had any interest in each other's activities (Appleyard 1973, 87).

The causes of the lack of communication between researchers and professionals were various. Firstly, there was a fundamental difference in ways of thinking between the two disciplines. For example, research dealt with specific case-studies while professionals found it difficult to apply the resulting conclusions to complex, general problems which were recurrent in architectural design). Secondly, there was a problem of attitude, specifically a lack of interest by professionals in research findings, or a feeling of being threatened by these findings due to the time and financial consequences. In addition, professionals fell under the ‘objective illusion’ and thought that their perceptions are universal (Appleyard 1973, 88). Appleyard (1973, 92-94) suggested that a theoretical model, which was at least partially based on empirical research could help sort out this miscommunication.

Views on architecture

The way in which architecture is conceived has a direct effect on the approaches to its study. The belief in architecture as a ‘work of art’ created by an ‘artist’ (i.e. the architect) has been a recurrent conviction for many reputed architects. Frank Lloyd Wright, one of the most influential architects of the 20th century, focused on the harmony of nature, which was expressed through the insertion of the building into a region, which was at the same time embedded into a nation (Leatherbarrow 2002, 271). Within this, he conceived the architect as the only being who had the ability to create the perfect space for each person. This idea fitted well with a bourgeois class who could afford to have a second home which to treat like ‘a work of art’, as Wright (1954, 180) himself referred to it. The architect was a designer with a holistic approach, who should design the perfect house with the perfect furniture, gardens, etc.

Egenter (1992, 35) saw a historical and cultural continuum of this belief, and attributed it to the fact that much of Western history was constructed not from facts, but from legends, ‘mixing up history and stories’ (Egenter 1992, 47). For him, the Christian proselytism based on classical values had had a distorting influence in Western humanities. He also highlighted the way in which art had been affected by the ‘renaissance ideal of the artist as a creator of the profane world’ (Egenter 1992, 35). This had reflected both on the history of architecture and on architectural practice. Rykwert, for example, developed the concept of the ‘primitive hut’ based on the descriptions of the Creation given in the Bible (Rykwert 1981, 13). Le Corbusier, Van der Rohe, Loos and others used these speculations to justify their designs (Egenter 1992, 96-97). In fact, this approach is still adopted today by many architects, despite the fact that since the sixties, particularly in Scandinavia, the socioeconomical and functional aspects of the building started gaining force (Izikowitz 1982, 103).

The classical concept of the building as art also implied its consideration as an ‘object’ that must have harmonic proportions which reflect a human ideal. Vesely (2002, 28) expressed the continued importance of this consideration in architectural theory when affirming that Pythagorean-platonic traditional proportions were the base of architectural thinking. He remarked the relation between body and architecture as a constant theme in European culture, which had its starting point in Vitruvius (Vesely 2002, 28). On the other hand, Egenter (1992, 47) criticised this belief that all classical architectural theory stemmed from Vitruvius’ work.

The consideration of the reciprocal influence of body and building, led Schlemmer to believe that the body went beyond just being contained by architectural space and became part of it. It was the body that created, filled and constituted the space (Feuerstein 2002, 229-231). However, for Rykwert, the body should not be considered in any different way whether it was in our out of a building (Leatherbarrow, 2002, 269).

In contrast with the classicist view of architecture, Egenter proposed a new definition that did not concentrate on aesthetics. He believed by eliminating aesthetics, architecture could be defined as anything that had been built by humans or even hominids (Egenter 1992, 77). This means that he considered architecture not just buildings, but also other structures not directly designed for inhabitancy.

For Egenter (1992, 79), the acknowledgement of human building behaviour as a continuum implied the integration of the individual on the theoretical basis of architecture. With the individual at the centre of this theoretical basis, architecture became a global phenomenon which could be synchronically and diachronically studied (Egenter 1992, 85).

To counteract the definition of architecture as a space with physical boundaries, Egenter distinguished four different types of architecture: subhuman architecture, which appeared prior to the Homo Sapiens Sapiens; semantic architecture, which was designed for space delimitation or symbolic purposes, not for inhabitancy; domestic architecture, which provided shelter, and settlement architecture. According to Egenter (1992, 157), it was possible to piece together a continuum of the constructive process which could have even influenced all hominization. Thus, these forms of architecture could reveal themselves as of universal importance and their evolution forms the basics of architectural history (Egenter 1992, 167).

Conclusion

Architectural psychology used experiments which were based on artificial circumstances, missing the spontaneity and the natural dynamicity of the living experience which could be captured anthropologically.

In addition, these experiments focused more on the qualities associated with being human rather than on culturally acquired knowledge and values. Determining the balance between psychological, sociological and cultural aspects is intricate; however, cultural aspects are crucial in the process of building, as shown by anthropology, and therefore should be taken into account in the same proportion.

Nevertheless, an important contribution of architectural psychology is its acknowledgement of the individual's experience and perception of architecture (Appleyard 1973, Lee 1973, Honikman 1971), reflected on the development of schemes with the aim of producing a more effective design targeted to western countries. Therefore, although the actual contents of these schemes were only partially based on empirical research and restricted to western values, their input is the very consideration of these values and the role they have in influencing the relationship between humans and buildings.

Another interesting aspect of many architectural psychology contributions (Canter 1973, Lee 1973) was that they regarded the man-building relationship as a two-way one, in which man and environment and, therefore, buildings, as part of this environment, influenced each other, although the way in which the individual influences the building was never explored very far. This was essentially due to the fact that the research had focused on western architecture, built by architects, and on public or civil buildings, not on houses.

On the other hand, many architectural studies suffer from focusing on constructs imposed on people, rather than building on observation and experience. In addition, these constructs are also nearly exclusively referred to western concepts, for example, the considerations about the effect of body and proportions on buildings (Dodds and Tavernor 2002).

Practically, many architectural studies have been more concerned with how the building space can be used to influence the individual's perception, rather than how its design is influenced by him. In this sense buildings, including houses, have been and continue to be considered 'works of art' by many architects. However, the fulfilment of aesthetic requirements can hardly be historically considered to have been the main motivation behind a particular house design.

The consideration of the building as a work of art not only immediately pre-empts the existence of 'an artist' (i.e. the architect) but it also creates a univocal relationship between the building and its architect, in a way which necessarily excludes the intervention of any other person in the process, i.e. the inhabitant. However, this exclusion of the inhabitant's input from the design process seems obsolete. In fact, architectural practice for public buildings in western countries is evolving towards an increasingly larger popular involvement in the design process (e.g. compulsory consultations for public projects).

Evaluation of relevant methodological contributions

Anthropology has fundamentally focused on houses as the space where many activities take place (Amerlinck, 2001, 7), activities which are useful to understand the social structures of a certain group, kinship, gender, the religion, etc. In this sense, it has dealt in particular with distribution and use of space and the way in which this reflect the particular characteristics of a society. However in many instances, the organisation of household space is described in anthropological studies without giving any indication of the material from which the structure is made (Mobjerg 1991; Engelstad 1991). Elements such as doors and beams are mentioned in as far as they explain overall issues of organisation of space, such as social restrictions or conventions, hierarchy issues etc (see Tanner 1991, 33). The house is sometimes described very concisely as an introduction, or certain features mentioned when they have a particular use for explaining certain activities or manifesting certain social or familiar position, etc.

Although anthropology has taken three-dimensionality into account when looking at concept of region, settlement patterns, territory, etc, it has paid little attention to the actual built structures delimitating these dimensions (Amerlinck 2001, 6). This has traditionally reflected on a lack of good drawings and images which could help further anthropological research (Izikowitz 1982, 2). In addition, the lack of physical detail prevented a synthesis and comparison of different structures across the world (Izikowitz 1982, 1).

Nevertheless, the recording of architecture as part of anthropological studies is more precise for certain geographical areas. For example, much of the anthropology literature referring to South Asian houses includes scaled plans, elevations and sections together with detailed descriptions of material and other house characteristics (Bernot 1982; Thomsen, 1982; Haagensen 1982).

The combined study of both cultural and functional aspects of the house can provide a fuller picture of the society to which the building belongs, not only synchronically when compared to other societies, but also diachronically throughout history.

Synchronically, the house can be a reflection of subtle differences between human groups, even if they apparently share the same culture and geographical conditions.

For example, Charpentier (1982) compared the houses of the two neighbouring regions of Vientiane and Luang Prabang, both classed as Lao. He took into account not just his own observations of space distribution and detailed descriptions of materials and techniques, but also the information that the inhabitants provided him with about their choices. He merged cultural and functional information into house elevations and plans showing distribution. Taking all these factors (social, economic, ritual and technical) into account, he was able to establish a typology of houses found in each province and draw parallels between the two provinces.

Milliet-Mondon (1982b) described how, although different groups in the Kali-Gandaki Valley (Nepal) shared the same house model, the individuals modified it to suit the natural resources available in each particular environment.

The mutual interaction between environmental constraints and human choices can be studied not only synchronically but also across history in a given area, as mentioned. The changes in the particular architecture of an area can be traced, together with the possible diffusion of types e.g. relation between mainland and insular South Asia houses (Henriksen 1982, 12-13). In Nepal, the several existing house types are a sign not only of the different geographical characteristics of each area, but also of the various ethnic groups. Although a certain house form is developed to suit a certain environment, the particular details of shape and spatial organisation are a reflection of particular physical and mental requirements (Milliet-Mondon 1982a, 165).

These diachronic studies also bring up the question of the continuity of basic features and whether house form follows human groups as their environment changes, with independence of its suitability (Henriksen 1982, 14).

In addition, integrating both material and cultural aspects can help avoid falling into evolutionist classifications: Clement (1982, 72) used a categorization based on systems of relationship between material features (e.g. rules of movements) instead of focusing on the features themselves (i.e. doors).

These attempts to define the material relation between building tradition and human groups have also been extended to the archaeological remains, despite archaeology having traditionally focused more on ‘high style’ buildings as opposed to ordinary houses (Amerlinck 2001, 6).

Sorensen (1982, 8) used a combination of ethnological information, prehistory and ancient house excavations and models from funerary context to reconstruct traditional building types in China (Sorensen 1982, 8). He identified several house types; the emergence and diffusion of these types mirrored the extension of the Yang Shao culture to several areas of China during the Miao-ti-K’ou I to II stages (4000-2500BC) and their adaptation to the particularities of each local area. In spite of this, the archaeological remains showed the perpetuation of certain characteristics –e.g. semi-subterranean structures-, despite not necessarily being the most suitable for certain specific environments (Sorensen 1982, 9).

Henriksen (1982, 19) carried out a reconstruction of a Neolithic house in Ban Kao (Thailand) (2000-1300 BC) based on studies of modern Thai village houses. She observed the modern houses and studied the use of space in relation, the gender differences, variety in colour, etc. She then discovered paralells with literary sources such as the Chinese Annals from the 2nd century BC, where some of the building elements were mentioned. The traditional subsistence ways of living of Thai farmers have perpetuated since the Neolithic, therefore she concluded that a correlation seemed to exist between socioeconomic structures and house types.

Therefore, the excavation of structures and their comparison to ethnographic data can provide information about what activities are most likely to leave a trace in the archaeological record. In addition, this comparison allows for a study of the cultural and environmental factors influencing the perpetuation of certain characteristics and not others (Engelstad 1991, 53).

Cultural, symbolic, material and functional factors involved in building must be taken into account in equal manner and be used to complement each other's understanding. To fulfil this task, the house should be described, measured, photographed and sketched (Bernot 1982, 36). This information must be complemented with information about the people that live in the house (Bernot 1982).

Haagensen (1982, 105) in his study of the village hamlet of Ban Mae Mai, distinguished between a physical structure, a functional and a socioeconomic structure. All of them had to be surveyed if we were to understand fully the connection between sociocultural and environmental characteristics and their built expression. For the physical survey, he adopted a field strategy from the general to the specifics: he surveyed all the built-up area at a scale of 1:200, showing the general floor plans of every house. He then divided the houses into different categories and fully surveyed some examples of each type, which he translated into drawings of plans, sections and elevations at 1:50. Apart from the obvious wealth of information that was obtained from this, Haagensen (1982, 105) believed that this was an optimum way of observing all structural and functional details, as well as attracting the attention of the villagers, which might facilitate data collection during the following phase. The functional and socioeconomic survey was based on official sources, observations and interviews. The latter were carried out with all family heads in the village and were standard and extensive (Haagensen 1982, 106). Some other interviews were carried out with other relevant individuals.

Haagensen's conclusion was that, although ideology definitely had an influence in building choices, the material conditions were what ultimately determined the particular characteristics of architecture (Haagensen 1982, 114).

Although Haagensen's scope of study was wider than what is feasible for the research undertaken for this thesis, it highlighted the importance of combining the study of all aspects which might have an influence in building. Conversely, the state of architecture can explain the economic, religious, etc state of affairs in a society (Haagensen 1982, 103). In addition, the combination of architectural and psychological considerations with other fields such as anthropology, geology and ecology is necessary. For this to be possible, different specialists need to have at least a basic awareness of the methods of other disciplines, for example, anthropologists should be able to describe building elements and record them (Amerlinck 2001, 12). Nevertheless, there have been some advances in this relation, for example, the development of the Environmental Design Research Association, which was created to foster ties between behaviour and design research. [5]

The combination of observation, survey, interviews and written sources is therefore key for an informative research. The environmental and climatic characteristics must be described, for they also have an effect on house construction (Milliet-Mondon, 1982b). The data regarding all aspects involved in building collected during fieldwork, can then be theorised upon, and these assumptions be checked again in the field (Egenter 1992, 81). However, generalisations must be based on a representative enough sample and the breadth of this sample be specified before proceeding to categorise houses into types (this is not mentioned, for example, in Sorensen, 1982; Clement, 1982).

[5] http://www.edra.org/

Appendix - Document 3 – Questionnaire (Lozach and Hug 1924, 118-124)

QUESTIONNAIRE.

Nom du village. — *Name of the village.*
Nom du markaz. — *Name of the markaz.*
Nom de la moudirieh. — *Name of the mudiria.*

I. — LA MAISON. — *THE HOUSE.*

1° Quelles sont les dimensions de la majorité des maisons du village? — *What are the dimensions of the majority of the houses in the village?*

a) Longueur. — *Length.*
b) Largeur. — *Width.*
c) Hauteur. — *Height.*

2° a) Combien y a-t-il d'étages généralement? — *How many stories generally?*
b) Combien y a-t-il de pièces? — *How many rooms?*
Quel usage fait-on de chacune d'elles? — *Their use?*

3° De quoi la maison est-elle couverte (branches de coton, tiges et feuilles de maïs ou de canne à sucre, de palmiers, etc.)? — *What materials are used for covering the house (cotton stalks, maize or sugar cane, leaves and stalks, palm trees, etc.)?*

Quelle est la forme du toit (plat ou en coupole)? — *What is the shape of the roof (flat or domed)?*

Y a-t-il au-dessus du toit des récipients de terre pour contenir les denrées (grains, etc.)? — *Are any mud recipients on the roof to contain grain or other foodstuffs?*

4° Quelles sont les dimensions de la porte? — *What are the dimensions of the door?*

De quel bois est-elle faite? — *Of what kind of wood it is made?*

Où se trouve-t-elle (au milieu du mur ou sur le côté)? — *Where is it placed (in the middle or on the side of the wall)?*

Y a-t-il des fenêtres; combien? — *Are there any windows; how many?*

De quoi sont-elles faites? — *Of what materials are the windows made?*

Quelles sont leurs dimensions? — *What are the dimensions of the windows?*

Quel côté (nord, est, sud, ouest) préfère-t-on pour les portes et les fenêtres? — *The exposure prefered (North, East, South, West)?*

Où fait-on généralement le feu? A l'intérieur ou à l'extérieur? — *Where do they light the fire, inside or outside the house?*

Dans le premier cas, par où s'échappe la fumée? — *In the first case, from where does the smoke go out?*

5° Y a-t-il dans le village même quelques maisons plus belles? — *Are there any houses in the village finer than the others?*

Par quoi se distinguent-elles des autres (nombre d'étages, décoration de la façade, matériaux de construction, etc.)? — *What are their distinctive features (number of stories, decoration of the façade, building materials, etc.)?*

Occupations ou fonctions de leurs propriétaires? — *Profession or functions of the owners?*

6° Où met-on les outils et instruments agricoles? — *Where are the tools and agricultural instruments put?*

Ces instruments appartiennent-ils toujours à ceux qui les emploient? — *Do these implements always belong to those who employ them?*

7° Où sont logés les animaux (gamouses, vaches, chameaux, moutons et chèvres)? — *Where are the animals kept (gamooses, cows, camels, sheep and goats)?*

Où met-on les volailles la nuit (poules, canards, dindons, etc.)? — *Where are the poultry kept for the night (hens, ducks, turkeys, etc.)?*

Y a-t-il une cour ou une pièce pour elles? — *Are there any yards or rooms for them?*

Y a-t-il des pigeonniers? — *Are there any pigeon-houses?*

Quelles sont leur hauteur et leur forme? — *What is the height and shape of these?*

Où se trouvent-ils? Au-dessus des terrasses ou isolés de l'habitation? — *Where are they, above the terraces or isolated from the habitation?*

8° De quoi sont faites généralement les maisons des fellahs? — *Of what materials are the houses of fellahs generally made?*

a) Terre avec paille ou bois? — *Mud mixed with straw, or mud with wood beams?*

b) Brique crue ou cuite? — *Crude or burned bricks?*

c) Pierres (grès ou calcaires)? — *Stones (sandstones or limestones)?*

D'où viennent-elles? — *From where are those stones procured?*

d) Matériaux provenant de villes anciennes (quel kom)? — *Materials extracted from ancien towns (what kom)?*

e) De quel bois se sert-on pour construire les maisons? — *What kind of wood is used for constructing houses?*

f) Les murs des maisons sont-il couverts d'un lait de chaux ou de peinture? — *Are the walls of the houses covered with milk of lime or painted?*

g) Ces murs sont-ils couverts de bouse de vache ou de gamouse? — *Are these walls covered with cows or gamooses dung?*

II. — LE VILLAGE. — *THE VILLAGE.*

1° A combien de kilomètres le village se trouve-t-il — *What is the distance in kilometres from the village to :*

a) De la gare de chemin de fer? — *The railway station?*

Quelle gare? — *Which station?*

b) Du drain public? — *The public drain?*

Du canal (quel drain, quel canal)? — *The canal (which drain, which canal)?*

2° Le village est-il bâti sur une colline naturelle ou artificielle (kom)? — *Is the village built on natural or artificial hill (kom)?*

Quelle est sa hauteur au-dessus des champs environnants? — *Its height above surrounding fields?*

Pour les régions d'irrigation par bassins. *This refers to districts irrigated by basins.*

Pendant l'inondation, à quelle distance des premières maisons s'arrête l'eau? — *During the Nile flood how far from the first houses does the water stop?*

Le village a-t-il été parfois inondé? — *Has the village been sometimes inundated?*

Y a-t-il une mare ou un étang auprès du village? — *Is there any pool or pond near the village?*

3° Où puise-t-on l'eau potable — *From what sources is the drinkable water taken :*

a) Pendant la crue? — *During the Nile flood?*

b) En hiver? — *In winter time?*

c) En été? — *During summer?*

4° Y a-t-il beaucoup d'arbres dans le village? — *Are there many trees in the village?*

Et autour du village? — *And round the village?*

Quelles sortes d'arbres? — *What kinds of trees?*

5° Les maisons sont-elles généralement serrées les unes contre les autres ou séparées les unes des autres? — *Do the houses stand close to one another or are they distant from each other?*

Les incendies sont-ils fréquents? — *Are fires frequent?*

Combien y en a-t-il eu depuis dix ans? — *How many fires have taken place during the last ten years?*

6° a) Où se trouvent les chounas de coton? — *Where are the cotton shounas situated?*

A qui appartiennent-elles? — *To whom do they belong?*

b) Où dépose-t-on la canne à sucre après la coupe? — *After the cutting, where are the sugar canes laid down?*

c) Où se trouve l'aire destinée au séchage et au battage des grains (riz, maïs, blé). Dans le village ou à l'extérieur? — *Where is the area situated on which the cereals (rice, maize, corn) are dried and trashed. In or outside the village?*

d) Le battage des grains donne-t-il lieu à la construction de petites cabanes de paille ou de roseaux pour les ouvriers et les gardiens? — *Is it the habit, when the grain is trashed, to construct straw or reed huts for workmen and ghaffirs?*

7° *a*) Combien y a-t-il de propriétaires habitant le village et faisant travailler leurs terres? — *How many of the landowners live in the village and employ workmen on their land?*

b) Combien y a-t-il de propriétaires habitant le village et travaillant eux-mêmes leurs terres? — *How many of the landowners work on their land themselves?*

c) Combien de travailleurs agricoles (hommes, femmes, enfants)? — *What is the number of agricultural labourers (men, women, boys)?*

d) Combien d'ouvriers (charpentiers, charrons, tisserands, vanniers, etc.)? — *What is the number of artisans (carpenters, wheelwrights, weavers, basket-makers, etc.)?*

e) Y a-t-il des commerçants (baqals, marchands de drap, etc.)? — *Are there any merchants (Bagals, woolen-drapers, etc.)?*

Sont-ils égyptiens? — *Are they Egyptians?*

Sont-ils étrangers? — *Are they foreigners?*

8° Le village comprend-il des ezbehs? — *Are they any ezbehs pertaining to the village?*

Combien? — *How many?*

Quelle est la distance de l'ezbeh la plus proche? — *What is the distance between the village and the nearest ezbeh?*

Quelle est la distance de l'ezbeh la plus éloignée? — *What is the distance between the village and the farthest ezbeh?*

Quelle est en moyenne la surface des terres dépendant de ces ezbehs? — *What is the average area of the land dependent on these ezbehs?*

D'où vient l'eau potable? — *From what sources drinkable water is drawn?*

Y a-t-il des puits artésiens dans ces ezbehs? — *Are there any artesian wells in these ezbehs?*

Combien? — *How many?*

Combien y a-t-il d'habitants dans les ezbehs dépendant du village? — *How many inhabitants are living in the ezbehs dependent on the village?*

9° Y a-t-il des Bédouins dans le village? — *Are there any Bedouins in the village?*

Combien? — *How many?*

Vivent-ils dans le village, ou hors du village? — *Do they live in or outside the village?*

A quelle distance de l'agglomération? — *At what distance from the agglomeration?*

Quelles sont leurs ressources? — *What are their resources?*

Voyagent-ils? — *Are they wanderers or settled?*

Où sont-ils fixés dans le village? — *Where are they in the village?*

Leurs tentes sont-elles fixes ou transportables? — *Are their tents stable or movable?*

Appendix – Document 4: Letter distributed to interviewees[6]

Dear friend,

I am a Spanish student working on my doctorate at the University of Durham, UK. I am travelling around different parts of Egypt to learn about traditional Egyptian houses. I am interested in knowing what traditions exist in different villages, how people live their lives inside their houses and how they repair them.

I have studied Ancient Egyptian houses for several years and I believe traditional Egyptian houses are similar to Ancient houses in many ways. However, I know many traditional houses are disappearing, so I want to make sure this part of Egyptian culture gets preserved and can also be used to find out more about Pharaonic houses.

To do this, I need to study the houses in your village (measure them, draw them, take pictures...) and I also need to speak to the people that live in them. Your help is totally voluntary, and your name will not be published. I can assure you that anything you say will only be used to learn more about Egyptian life in traditional villages, but if at any time you change your mind and do not want to help any more, please say so.

If you want me to do so, after I finish my studies I can write to you to let you know how talking to you has contributed to my research. I want you to know that this research will be published in the UK and people will be able to access it in libraries.

I need to record my chat with you so I can translate it into English and make the best use of it. However, if you do not want me to record our conversation, please let me know and I will just take notes of what you say.

If you have any questions, please feel comfortable to ask me.

Thank you very much for your help; this research would not be possible without you.

Maria Correas-Amador

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[6] The content and style of this letter were based on the recommendations given during the Durham University Graduate School courses ‘Interviews I’ and ‘Interviews II’.

Appendix – Document 5: Interview questions

INTRODUCTORY QUESTIONS: Is this your family house? Have you been living here for a long time?

AREA 1: WHAT ARE THE KEY FACTORS THAT INFLUENCE THE CHOICE OF ADOBE AND ORGANIC MATERIALS WHEN BUILDING?

The aim is to investigate in what proportion tradition, practicality and availability influence the choice of materials when building a house.

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?
2) Did you get these materials from around here?
3) Is mud good for your needs?
4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?
5) Who taught you about the practicality of these materials {if appropriate}?
6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?
7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?
8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

The aim is to investigate the socio-cultural factors that influence the way in which houses are built and how they are built, i.e. tradition, community structure, class differences, society pressures and cultural influences.

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?
10) Do the houses of people in the village with the same job as you look similar to yours?
11) Can you give me an example of a house in your village that looks different to yours?
12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?
13) When building a house, do you think it is very important that it suits your particular needs?
14) Is it important for you that your house looks similar to others in the village?
15) If you could rebuild your house, would you do it in a different way now?
16) Would you say your house is traditional of this village? And a traditional Egyptian house?
17) Is it important for you that the animals live close to you?
18) Do you use the same room for different things depending on the time of the year (Season)?
19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

AREA 3: WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

Although most of this topic area will be explored through the observation and architectural survey, the aim is to collect information regarding specific features which have been identified in the archaeological record as potentially representative of Ancient Egyptian domestic architecture, and explore the possible similarities with modern Egyptian practices.

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?
21) Where inside your house can you feel the air coming in?
22) Do you cook at the back of the house? In the courtyard?
23) Would you say there is a public and a private area in your house?
24) What is the use of your windows?

AREA 4: PRACTICAL QUESTIONS:

These questions are aimed directly to complement and contrast the information obtained through observation and surveys.

25) What would you say the most used room in the house is? What activities do you undertake there?
26) Are there any areas in which you can perform certain activities but not others?
27) Do you prefer reconstructing or repairing?
28) Do you spend more time in open or closed spaces within your house (and plot of land)?
29) How do you keep cool in the summer? And warm in the winter?

Appendix – Document 6: Building features checklist

BUILDINGS FEATURES QUICK CHECKLIST

Location: Date: Code assigned:

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☐ Evidence:.............

STRUCTURE: Any visible structural elements (description):....................... (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☐ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☐ Mortar: .... d) Other ....

3) Wall profile:
   a) Straight ☐ b) Curved out ☐ Details................ c) Other ☐ ....

4) Render/external finish: Description: ....

OPENINGS:

5) External openings:
   - Number:
   - Estimated length/width:
   - Window frames: a) No ☐ b)Yes ☐ c) Material: .... d) Glass?

6) Entrance openings: a) Doors ☐ material: .... c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☐ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☐ b) Yes ☐ Material: ....
10) Vents: a)No ☐ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☐ b) Yes ☐
12) External staircase: a) No ☐ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☐ b) Yes ☐

Appendix – Document 7: Building features checklist

BUILDINGS FEATURES QUICK CHECKLIST

Location: Najrij Date: 29/03/09 Code assigned: NAJ01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....1................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☒ Evidence:..stone...

STRUCTURE: Any visible structural elements (description):.lintel,beams,... (lintels, beams...) buttress, reinforcement on facade

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: ...wood..... c) Concrete ☐ d)Other ....

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: Sandy mud d) Other repaired with red brick

3) Wall profile:
a) Straight ☒ b) Curved out ☐ Details................. c) Other ☐ ....

4) Render/external finish: Description: ...thin, mud render, many pieces of straw

OPENINGS:

5) External openings:
- Number: 2
- Estimated length/width: c. 7 x 3.5 m
- Window frames: a) No ☐ b)Yes ☒ c) Material: .wood......... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☒ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....c. 3.5m.........

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☐ b) Yes ☒

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: ....plastic..... number....1. Animals in or outside the house: outside

BUILDINGS FEATURES QUICK CHECKLIST

Location: Najrij   Date: 29/03/09   Code assigned: NAJ02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....2...............
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☒ Evidence:..stone...

STRUCTURE: Any visible structural elements (description):.beams............ (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth☐ c) Bricks ☒ Mortar: Sandy mud d) Other ....

3) Wall profile:
   a) Straight ☐ b) Curved out ☒ Details..very slightly c) Other ☐ ....

4) Render/external finish: Description: ...mud, medium thickness, remains of white and yellow paint

OPENINGS:

5) External openings:
   - Number: 6
   - Estimated length/width:
   - Window frames: a) No ☒ b)Yes ☒ c) Material: ..wood....... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....c. 5m..........

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: .... number...... Animals in or outside the house: n/a

BUILDINGS FEATURES QUICK CHECKLIST

Location: Najrij   Date: 31/03/09   Code assigned: NAJ03

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....2...............
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels............. (lintels, beams...)

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: Dark mud.. d) Other ....

3) Wall profile:
a) Straight ☒ b) Curved out ☐ Details................. c) Other ☐ ....

4) Render/external finish: Description: ...very thin mud render, does not flake off, remains of paint of various colours mainly blue and yellow

OPENINGS:

5) External openings:
- Number: 4
- Estimated length/width: 5.5 x 3
- Window frames: a) No ☒ b)Yes ☒ c) Material: ..wood....... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....c. 5m..........

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: ....2............ number...... Animals in or outside the house: in back yard

BUILDINGS FEATURES QUICK CHECKLIST

Location: Kom el Abiad Date: 29/03/09 Code assigned: KEA01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☒ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....2...............
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☒ Evidence:..stone?..

STRUCTURE: Any visible structural elements (description):.lintels,............ (lintels, beams...)
reinforcement first floor, beams

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ..red brick.
around door

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: mud.......... d) Other ....

3) Wall profile:
a) Straight ☐ b) Curved out ☐ Details................. c) Other ☒ ...reinforced at the bottom

4) Render/external finish: Description: ....well preserved, evidence of repairs with darker-coloured mud

OPENINGS:

5) External openings:
- Number: 7
- Estimated length/width:
- Window frames: a) No ☐ b)Yes ☒ c) Material: ...wood......... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ...stone lintel.......

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....5m...............

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☐ b) Yes ☐ Material: ....
10) Vents: a)No ☐ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....stables.....
15) Pens: .... number...... Animals in or outside the house: both

BUILDINGS FEATURES QUICK CHECKLIST

Location: Kom en Naggar Date: 25/03/09 Code assigned: KEN01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☒
B) Number of floors: ....2.......................
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description): lintels, beams. (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: pottery pieces c) Concrete ☐ d)Other ...Red brick

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: ....mud... d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................. c) Other ☐ ..Bulky profile, reinforced at bottor

4) Render/external finish: Description: ..mud with many pieces of straw, some large

OPENINGS:

5) External openings:
   - Number: 3
   - Estimated length/width:
   - Window frames: a) No ☐ b)Yes ☒ c) Material: ..Wood...... d) Glass? x

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☒
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING: Two doors (front and back)

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: ....2............... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Surad Date: 27/3/09 Code assigned: SUR01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED [X] TERRACED ☐ COURTYARD ☐
B) Number of floors: ....
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):......................... (lintels, beams...) Lintels: windows, (
Beams in facade. Buttress

WALLS:

1) Building material:
   a) Mud [X] b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe [X] b) Rammed earth ☐ c) Bricks [X] Mortar: .... d) Other ....

3) Wall profile:
   a) Straight ☐ b) Curved out [X] Details....Very slightly c) Other ☐ ....

4) Render/external finish: Description: ...Mud render and remains of white and yellow paint

OPENINGS:

5) External openings:
   - Number: 1
   - Estimated length/width:
   - Window frames: a) No ☐ b)Yes [X] c) Material: ...Wood..... d) Glass?

6) Entrance openings: a) Doors [X] material: .... c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched [X] c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No [X] b) Yes ☐ Material: ....
10) Vents: a)No [X] b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No [X] b) Yes ☐
12) External staircase: a) No [X] b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No [X] b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ..Front enclosure, red brick
15) Pens: .... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Hissat Abbar Date: 30/03/09 Code assigned: SHA01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....1................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintel,beams,... (lintels, beams...) buttress, reinforcement on facade

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: Sandy mud d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................ c) Other ☐ ....

4) Render/external finish: Description: ...very thin, mud render

OPENINGS:

5) External openings:
   - Number: 1
   - Estimated length/width:
   - Window frames: a) No ☒ b)Yes ☐ c) Material: .... d) Glass?

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: ....2............. number...... Animals in or outside the house: inside, back

BUILDINGS FEATURES QUICK CHECKLIST

Location: Hissat Abbar   Date: 30/03/09   Code assigned: HAB02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....2........................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description): lintels.............. (lintels, beams...)
structural beams below roof

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: Hardly visible d) Other ....

3) Wall profile:
   a) Straight ☐ b) Curved out ☒ Details..Sightly from mid-floor c) Other ☐ ....

4) Render/external finish: Description: ..thin but compact, remains of green paint

OPENINGS:

5) External openings:
   - Number: 7
   - Estimated length/width:
   - Window frames: a) No ☐ b)Yes ☒ c) Material: ..Wood...... d) Glass? x

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....5-7................

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING: Two doors (front and back)

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: .... number...... Animals in or outside the house: In

BUILDINGS FEATURES QUICK CHECKLIST

Location: Sa el-Hagar Date: 26/03/09 Code assigned: SEH01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☒ Evidence:.....Stone

STRUCTURE: Any visible structural elements (description):........................ (lintels, beams...)
Square beams (x7) at roof level, square/round beams at first floor height.

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: wool, stone, pottery, shells c) Concrete ☐ d)Other ....

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth☐ c) Bricks ☒ Mortar: ..Mud....... d) Other ....

3) Wall profile:
a) Straight ☒ b) Curved out ☐ Details................ c) Other ☐ ....

4) Render/external finish: Description: .....Upper half: mud render, white-washed concrete render around door (remains of another layer of yellow and of white paint, white-washed mud render bottom half.

OPENINGS:

5) External openings:
- Number: 8
- Estimated length/width: 6x4 m
- Window frames: a) No ☐ b)Yes ☒ c) Material: .....wood.. d) Glass? no

6) Entrance openings: a) Doors ☒ material: .....wood c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☒ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....3,5..........

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ..shed............
15) Pens: .... number...... Animals in or outside the house: In

BUILDINGS FEATURES QUICK CHECKLIST

Location: Sa el-Hagar Date: 26/03/09 Code assigned: SEH02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....1........................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☐ Yes ☒ Evidence:....mud platform

STRUCTURE: Any visible structural elements (description): lintels, beams. (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: pottery pieces c) Concrete ☐ d)Other ...Red brick

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: very thin.... d) Other ....

3) Wall profile:
   a) Straight ☐ b) Curved out ☐ Details................. c) Other ☒ ..Bulky profile, caused by repair

4) Render/external finish: Description: ..white-washed mud render, very thick

OPENINGS:

5) External openings:
   - Number: 4
   - Estimated length/width: 7.70 x 7
   - Window frames: a) No ☐ b)Yes ☒ c) Material: .... d) Glass? x

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☒
8) Estimate floor to ceiling: ....2.60..............

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING: Two doors (front and back)

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: ....1............... number...... Animals in or outside the house: both

BUILDINGS FEATURES QUICK CHECKLIST

Location: Kom Surad   Date: 28/03/09   Code assigned: KOS01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED [x] TERRACED ☐ COURTYARD ☐
B) Number of floors: ....2........................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No [x] Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description): lintels.............. (lintels, beams...)
corner buttresses
first floor reinforcement

WALLS:

1) Building material:
a) Mud [x] b) Other organic materials: .... c) Concrete ☐ d)Other ...Red brick

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks [x] Mortar: .... d) Other ....
Mud brick (first floor), red brick (ground floor)

3) Wall profile:
a) Straight ☐ b) Curved out [x] Details................. c) Other ☐ ....

4) Render/external finish: Description: ..mud.render, repaired in places

OPENINGS:

5) External openings:
- Number: 6
- Estimated length/width:
- Window frames: a) No ☐ b)Yes [x] c) Material: ..Wood...... d) Glass? x

6) Entrance openings: a) Doors [x] material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched [x] c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: [x]
Plastic
8) Estimate floor to ceiling: ....c..5m............

VENTILATION/EXTRACTION:

9) Chimneys: a) No [x] b) Yes ☐ Material: ....
10) Vents: a)No ☐ b) Yes [x] Description: ....1...................

ACCESS TO THE BUILDING: Two doors (front and back)

11) Porch: a) No [x] b) Yes ☐
12) External staircase: a) No [x] b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No [x] b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: .... number...... Animals in or outside the house: n/a

BUILDINGS FEATURES QUICK CHECKLIST

Location: Kom Surad Date: 28/03/09 Code assigned: KOS02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☒ SEMI-DETATCHED ☐ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....1......................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels.............. (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ...Red brick

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth☐ c) Bricks ☒ Mortar: ....mud... d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................ c) Other ☐ ....

4) Render/external finish: Description: ..thin mud render, remains of paint of several colours

OPENINGS:

5) External openings:
   - Number: numerous, no particular order, small size
   - Estimated length/width: L-shaped
   - Window frames: a) No ☒ b)Yes ☒ c) Material: ..Wood...... d) Glass? x

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☒
8) Estimate floor to ceiling: ....c. 3m...........

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING: Two doors (front and back)

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☐ b) Yes ☐ Quantity: .....ladder to roof
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....shed.....
15) Pens: .... number......1 Animals in or outside the house: outside, associated

BUILDINGS FEATURES QUICK CHECKLIST

Location: Shabbas Ummayir Date: 05/04/09 Code assigned: SHU01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....2................
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.....lintels.......... (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: .... d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................. c) Other ☐ ....

4) Render/external finish: Description: ....Fairly thick, light, mud render, well preserved

OPENINGS:

5) External openings:
   - Number: 1
   - Estimated length/width: c. 6 x 2.5
   - Window frames: a) No ☒ b)Yes ☐ c) Material: .... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☐ b) Yes ☒ Description: ......1.....................

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☐ b) Yes ☒

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: .... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Shabbas Ummayir Date: 05/04/09 Code assigned: SHU02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☒ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....1................
C) Associated land: NONE ☐ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.....lintels.......... (lintels, beams...)

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: damaged.. d) Other ....

3) Wall profile:
a) Straight ☐ b) Curved out ☒ Details.very......... pronounced c) Other ☐ ....

4) Render/external finish: Description: .....Thin mud render, large quantity of straw

OPENINGS:

5) External openings:
- Number: 1
- Estimated length/width: 2.3 m long
- Window frames: a) No ☐ b)Yes ☒ c) Material: .... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☐ b) Yes ☒

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: .... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Birma Date: 1/04/09 Code assigned: BIR01

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☒ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....2...............
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels, beams. (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....red brick (1st floor)

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth☐ c) Bricks ☒ Mortar: very thin.... d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................ c) Other ☐ ....

4) Render/external finish: Description: ...mud, in disrepair, remains of yellow and white paint

OPENINGS:

5) External openings:
   - Number: 5
   - Estimated length/width: c. 7 x 3.5
   - Window frames: a) No ☐ b)Yes ☒ c) Material: wood....... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☒ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....n/a.......
15) Pens: ....n/a......... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Birma Date: 1/04/09 Code assigned: BIR02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☒ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....2................
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels.............. (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: mud.......... d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................. c) Other ☐ ....

4) Render/external finish: Description: ...white-washed,mud render only ground floor, dark mud render on first floor and naked brick roof terrace

OPENINGS:

5) External openings:
   - Number: 3
   - Estimated length/width: c. 7 x 3.5
   - Window frames: a) No ☒ b)Yes ☒ c) Material: .wood....... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☐ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☒ e)Modern materials: ☐
8) Estimate floor to ceiling: ....c.5m............

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....not visible
15) Pens: .... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Birma Date: 1/04/09 Code assigned: BIR02

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☒ TERRACED ☐ COURTYARD ☐
B) Number of floors: ....2................
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☒ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels, beams. (lintels, beams...)

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....red brick (inside)

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: mud.......... d) Other ....

3) Wall profile:
a) Straight ☒ b) Curved out ☒ Details..slightly at 1st floor level c) Other ☐ ....

4) Render/external finish: Description: ...yellow and blue paint, sandy cement, very thin mud render underr repaired in places

OPENINGS:

5) External openings:
- Number: 6
- Estimated length/width: c. 10 x 7
- Window frames: a) No ☐ b)Yes ☒ c) Material: wood....... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☒ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☐ e)Modern materials: ☐
8) Estimate floor to ceiling: ....c.7m.............

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☒ b) Yes ☐ Material: ....
10) Vents: a)No ☒ b) Yes ☐ Description: ....

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....1..garage
15) Pens: .... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Birma Date: 1/04/09 Code assigned: BIR04

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....2...............
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels,.1st.floor(lintels, beams...) reinforcement, beam

WALLS:

1) Building material:
a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ....

2) Walls building technique:
a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: mud.......... d) Other ....

3) Wall profile:
a) Straight ☒ b) Curved out ☒ Details..slightly.at 1st floor level c) Other ☐ ....

4) Render/external finish: Description: ...fully.painted, various colours. Very well preserved cement render, previous mud render

OPENINGS:

5) External openings:
- Number: 5
- Estimated length/width: c. 7 x 8
- Window frames: a) No ☐ b)Yes ☒ c) Material: .wood........ d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☐ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☒ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☐ b) Yes ☐ Material: .....not.visible.....
10) Vents: a)No ☐ b) Yes ☐ Description: ......not.visible......

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....
15) Pens: .... number...... Animals in or outside the house:

BUILDINGS FEATURES QUICK CHECKLIST

Location: Birma Date: 1/04/09 Code assigned: BIR05

BUILDING IDENTIFICATION/CLASSIFICATION:

A) Building unit: DETATCHED ☐ SEMI-DETATCHED ☐ TERRACED ☒ COURTYARD ☐
B) Number of floors: ....2...............
C) Associated land: NONE ☒ DIRECTLY ASSOCIATED ☐ DISASSOCIATED ☐ SHARED LAND ☐

FOUNDATIONS: No ☒ Yes ☐ Evidence:..............

STRUCTURE: Any visible structural elements (description):.lintels............. (lintels, beams...)

WALLS:

1) Building material:
   a) Mud ☒ b) Other organic materials: .... c) Concrete ☐ d)Other ..red brick. around door

2) Walls building technique:
   a) Plain Adobe ☐ b) Rammed earth ☐ c) Bricks ☒ Mortar: mud.......... d) Other ....

3) Wall profile:
   a) Straight ☒ b) Curved out ☐ Details................ c) Other ☐ ....

4) Render/external finish: Description: ...painted, thick mud render, many pieces of straw, cement repair in

OPENINGS:

5) External openings:
   - Number: 5
   - Estimated length/width: c. 10 x 5
   - Window frames: a) No ☐ b)Yes ☒ c) Material: ..wood......... d) Glass? no

6) Entrance openings: a) Doors ☒ material: ....wood. c)Other: ....

ROOF:

7) a) No roof ☐ b) Thatched ☐ c) Mud ☐ d) Mixed (i.e. thatched&mud) ☒ e)Modern materials: ☐
8) Estimate floor to ceiling: ....

VENTILATION/EXTRACTION:

9) Chimneys: a) No ☐ b) Yes ☐ Material: .....not visible.....
10) Vents: a)No ☐ b) Yes ☐ Description: ......not visible......

ACCESS TO THE BUILDING:

11) Porch: a) No ☒ b) Yes ☐
12) External staircase: a) No ☒ b) Yes ☐ Quantity: ....
13) Footpaths/drives: a) No ☒ b) Yes ☐

ADJACENT STRUCTURES:

14) Type: ....n/a...........
15) Pens: ....n/a........... number...... Animals in or outside the house:

Appendix – Document 8: Mud as a building material

The main advantage of soil as a material for construction is that of being widely available. Most soil types are suitable for earth construction, although the ones from river beds and banks are particularly fitting due to their high content in silt (Van Beek and Van Beek 2008, 129). Large amounts of clay are not convenient as this one experiences a reduction in size when dry.

Topographical circumstances have a vital influence in the formation of soils (Ibrahim and Ibrahim 2003, 53). In turn, the characteristics and properties of the soil fully influence the final building product. While all construction with soil is suitable for hot countries, particular soils are more adequate or require fewer alterations to depending on the specifics of the design (Houben and Guillaud 1994, 108). In addition, some soils suit some building techniques better than others. Therefore, it seems appropriate to concentrate here on the types of soil available in Egypt.

Ibrahim and Ibrahim (2003, 52) pointed out that all Egypt soils share some common characteristics such as a low humus content, having a coarse to medium-fine texture and being subject to very basic biological activity. However, two main types of soil can be differentiated, entisoils and aridsoils (Ibrahim and Ibrahim 2003, 52). Entisoils, are found in certain areas of the Nile Delta and the Qattara Depression (Ibrahim 2003, 53). These soils are usually very saline (Houben and Guillaud 1994, 39; Ibrahim and Ibrahim 2003, 52). Aridsoils are characterised for being normally alluvial and rich in minerals and their texture usually becomes rougher with depth. They can also be found in sandy and rocky deserts (Ibrahim and Ibrahim 2003, 52). Their colour can vary, ranging from ochre (high ground) to grey (flood plain) and black (marshes) (Houben and Guillaud 1994, 39).

A fundamental factor that influences soil properties is water, materialised in variations in free water, pore water and soil solution (Houben and Guillaud 1994, 23). All three can be eliminated at room temperature, although pore water requires drying between 50 and 120 C beforehand. Mud is the result of the saturation of soil with water into a semi-liquid mixture (Houben and Guillaud 1994, 22). Soil properties are also subject to alterations depending on the amount of organic matter, mineral substances (pebbles, gravel, sands, silt, clays and colloids) and sandy components (Houben and Guillaud 1994, 23-24).

There are several types of construction techniques concerned with the use of earth as a material, generally divided into: wattle-and-daub, layered mud, rammed earth and mud brick (Van Beek and Van Beek 2008, 132). Houben and Guillaud (1994, 4) further classified them into adobe, rammed earth, straw-clay, wattle and daub, direct shaping, compressed earth blocks and cob. These techniques have a direct effect on the building outcome.

Construction with soil is usually characterised by employing other organic materials such as vegetal and animal by-products, normally the ones which are locally available (Houben and Guillaud 1994, 98). These can be used to correct the deficiencies of the soil (e.g. inclusion of chaff or chopped straw reduces the risk of cracking while the soil mixture is drying (Van Beek and Van Beek 2008, 135)) and as rendering to minimise the impact of water (e.g. ashes and vegetable oils (Houben and Guillaud 1994, 98)). However, the successful role of vegetal and animal by-products as stabilisers is directly related to the specific environmental and physical conditions (Houben and Guillaud 1994, 98).

Animal products are infrequently used to stabilise the soil, but are rather used for rendering, e.g. cowpats, horse and camel dung, pigeon droppings, horse urine, etc. In addition, animal blood, fur and hair act in a similar way to vegetable fibres, helping give consistency to the render. Other natural by-products can be lime from shells, animal glue from horn or bone, fish oils and animal fats (Houben and Guillaud 1994, 98). Vegetable by-products can also be employed as structural elements; such is the case of wood, which is used for beams and lintels.

The advantages of mud as a building material are that it is low-cost, flexible, naturally regulates temperature and is strong. However, the main disadvantage is that it is heavily reliant on maintenance and repair.

Soil as a building material is extremely cheap. This is due to the fact that it is naturally available and that use of energy, aside of human force, is not essential for its processing (Van Beek and Van Beek 2008, 19). Independently of space dimensions, materials are a prime factor in cost. For example, in Syria, a concrete house can cost three times as much as the traditional mud-brick ‘beehive house’ (Van Beek and Van Beek 2008, 21). In Dendera (Upper Egypt), the cost of sun-dried bricks doubles when these are fired (verbal reference).

In addition, the presence or not of other elements such as plasters (e.g. lime plaster) can be at least partially explained by their cost, which in Hadhramaut (southern Yemen) can represent two-thirds of the total construction cost of a house (Van Beek and Van Beek 2008, 22). Consequently, this might lead to a wider use of mud plaster and the use of lime plaster only on key areas.

Another advantage of mud is its flexibility, which allows for decorative details, such as wall panelling in single or multiple stages, zigzag patterns, etc. Not only that, but this flexibility also permits new details to be added to well-established traditional designs (Van Beek and Van Beek 2008, 29), which is in fact a common, recurrent process in vernacular architecture (Hubka 1986, 427). In practical terms, mud is capable of fulfilling the requirements of most buildings with a specific function (Van Beek and Van Beek 2000, 30). In addition, most structural elements such as roofs, walls and floors, can be built with mud. The flexibility of the material is also expressed in the specifics, for example, the possibility of designing rounded corners, which are less likely to get damaged by impact- or designing window openings in partition walls.

Another advantage of the use of soil as a building material is its ability to retain and regulate temperature (Van Beek and Van Beek 2008, 25). Many experiments have been carried out regarding thermal conductivity of mud-bricks in comparison to other materials. For example, Fathy’s experiments in Egypt (1973, 45-46) showed that mud-brick with a proportion of 20% fine sand, was the material that conducted less heat, less than half of that conducted by baked bricks and almost a fourth of that conducted by hollow concrete blocks.

However, this view has been challenged by Kemp (2000, 88) in whose experience mud can retain summer heat during the day until the night, and cold winter night temperatures during the day. It is likely that the specific local conditions and the precise composition of the bricks are responsible for this variability in perceptions (Kemp 2000, 88).

Mud is also a strong and durable material, provided that a series of considerations are taken into account from the offset and regular maintenance is carried out (Van Beek and Van Beek 2008, 36). The thickness of walls makes the building soundproof and the nature of the materials means that they can naturally resist fires. In addition, insect presence should not be a major problem as long as the place is kept clean (Van Beek and Van Beek 2008). However, Kemp (2000, 82) pointed out that insect infestation of bricks caused by their organic content has not been sufficiently studied.

In comparison to other materials, earthen structures are particularly vulnerable to water (Houben and Guillaud 1994, 246). However, the capacity to withstand this and other threats depends on the characteristics of the soil and the particular construction methods; for example, rammed earth is sturdier than mud-brick walls and can cope better with rain damage (Van Beek and Van Beek 2008, 36; Houben and Guillaud 1994, 332). Water can become a considerable problem for mud-brick structures, whether in the form of torrential downpours in arid areas or in the presence of filtration of subsoil water through the foundations, as is common in Upper Egypt (Reem Saad, pers. comm.).

In effect, it is un-evaporated water that can cause serious structural problems, given that it remains stored inside the walls. Mud buildings with solid foundations and base courses, protected wall tops and good rendering should be better prepared to avoid water-related problems (Houben and Guillaud 1994, 246; Van Beek and Van Beek 2008, 109). Joining areas in particular should be paid attention to, such as unions of lintels, jambs and sills with walls. Surface water, such as rain (unless floods occur), should not cause structural problems, but this is reliant on an adequate distribution of grain size within the soil, together with its structure and porosity (Houben and Guillaud 1994, 332).

Other factors which can hinder the strength and durability of mud houses are: physico-chemical faults (i.e. material disintegration); external factors (e.g. living organisms), as well as excess of stress caused by original construction deficiencies, later alterations in the building or accidents, which can be localised or affect the bulk of the wall (Houben and Guillaud 1994, 248).

Material disintegration can be caused by water, chronic dampness, excessive heat or frost. In addition, the material might be altered by the action of parasites and salts which were originally included in the soil, potentially causing the building to collapse in extreme cases (Houben and Guillaud 1994, 248).

If the quality of the earth is not supervised or there are dramatic changes in relative humidity, shrinkage in the form of vertical, regular cracks could also occur. Cracking is also a sign of high mechanical stress, which can result in 'bulging'. This could be caused by a disproportionate distribution of weight in certain areas. A combination of these stresses can also lead the building to collapse (Houben and Guillaud 1994, 248).

Other causes of structural defect directly related to construction deficiencies are: those related to site conditions, such as building on unstable ground (Houben and Guillaud 1994, 248; Van Beek and Van Beek 2008, 109); inaccuracies in the execution of building techniques; disproportionate wall height; excessive number of openings in the same wall or excessive variation in their sizes, amongst others. In addition, other faults are related to the material, such as mixture of different soils, incorrect level of moisture in the mixture, bricks of different characteristics, faulty brick bonding (Houben and Guillaud 1994, 248). Lastly, some are related to the role of structural elements, such as unsuitable lintels, bond between these and the walls and excess of load over lintels (Houben and Guillaud 1994, 266).

According to Houben and Guillaud (1994, 332) most earth houses across the world present the same defects caused by the weather: surface erosion, partial crumbling, chronic humidity and wall base erosion.

However, the use of materials is not always related to suitability. In addition to all these physical factors, we must consider the social and cultural factors related to earth as a building material. As mentioned, earth materials have a very low cost, meaning that these might be the only affordable materials for the lowest classes. Although traditional materials are recommended for being cheap, locally available and straightforward, these have not been encouraged by governments and aid agencies (Agarwal 1981, 7). As a result, inappropriate materials and techniques are brought from richer countries (Agarwal 1981, 28). For example, despite cement not being adequate due to the need for capital investment, its high use of energy and the lack of immediate availability, many international aid agencies have provided donations towards cement plants (Agarwal 1981, 34). Another factor for the promotion of concrete has been the growing need for house development due to the increase in world population. These materials have been imported from developed countries to be used as part of a wider programme to erradicate slums across the world (Agarwal 1981, 5-6); however, according to Mabogunje (1976, cited in Agarwal 1981, 18), not only are they unsuitable for the environment but they also widen the differences between social classes in developing countries, causing the users of traditional materials to be stigmatised as the poorest members of the community. For example, Van Beek and Van Beek (2008, 27) described an encounter with the owner of both a concrete and a mud house, who admittedly sacrificed the comfort given by the latter because of the social importance conceded to the ownership of the former within his community.

Sometimes, these social changes are inseparable from changes in the subsistence means, such as a decrease in agricultural activity. For example, in the highlands of Madagascar this has caused the traditional landscape of wooden houses to be altered, now being a combination of rich tin-roofed houses, brick and cob houses with tin or thatch roofs and a few wooden houses. The identity of this people expressed through the architecture has slowly disintegrated (Coulaud 1982, 197).

In other cases, a change in traditional materials with an excellent record is caused by an external interference, even if indirectly. For example, in north Thailand, the traditional *tek* wood was exploited by foreign companies and their local associates. As a result, the forests were nationalised and the wood increased in price. This caused the poorest villagers to resort to bamboo as a replacement and the richest to import unsuitable materials from abroad, destroying the traditional view of the villages characterised by the widespread use of *tek* wood (Haagensen 1982, 113).

Whether the form and style of houses is maintained independently of the change in material – and consequently in spite of social changes - is an issue that should be looked into. According to Izikowitz (1982, 5) there are indications that, at least in South and Southeast Asia, this might be the case.

Bernot (1982, 35) pointed out that the Swidden farmers built several grass houses during their lifetime, but do so copying the layout of the previous one, which in turn has been copied from another, and so the characteristics are preserved. Despite the fact that the construction materials have changed, the shape and layout of the house has remained unaffected by westernisation (Bernot 1982, 36).

ELEMENTS OF MUD CONSTRUCTION (based on Morton 2008)

ELEMENT	TYPE OF ELEMENT	VARIATIONS
Earth (mud)	Construction (masonry)	Different % of clay. Different grading of soil particles (silt, sand and gravel)
Fibres	Construction (masonry)	Little difference between various cereal straws i.e. hemp, flax, cloth waste (rarer)
Additives	Construction (masonry)	Bitumen, cement
Bricks	Construction (masonry)	Moulded, pressed, extruded. Blocks (larger size, require 2 hands)
Mortar	Construction (masonry)	Clay (with/out additive), non-hydraulic, hydraulic lime, cement (not recommended)
Render	Construction (masonry)	Plaster: clay, lime. Paint: lime wash, natural, synthetic paint (varying in vapour permeability) Oil Influence: colour, texture and finishes
Compressive strength	Structural	2-7 N/mm^2 compressive strength should support many storeys. Clay mortar favours strength.
Slenderness	Structural	Walls: Ratio 1:8 (no lateral restraint)-1:20 (unrestrained, use of additive-improved mortars) Columns: 2 bricks wide and deep minimum.
Stability	Structural	Buttresses in corners, windows, door openings, good structural connection to cross-walls, ties to other materials (occasional)
Bearings	Structural	Lintels: min. Bearing 250mm. Arches: for loads from openings over 1m wide.

Construction joints	Structural	Full mortar joints to beds and perpends. Local reinforcement For secondary structural effect: good bond to other materials.
Ledges, eaves.	Structural	Must be +30cm projection & rendered 20cm around (otherwise contributes to wind/rain erosion)
Shrinkage	Environmental	Varies with: clay content, particle size distribution, fibre and moisture content. Bricks: Earth bricks lower clay content 10-15%. 3-6% shrinkage in air-drying. Mortar: dry or wet (vulnerable to moisture content imbalance). Ordinary same constituents as bricks, but 4-10% clay content and coarser grading reduce shrinkage.
Thermal movement	Environmental	Constant variable: 0.006 mm/m K (lower than concrete)
Moisture content	Environmental	High content necessary to form bricks, but should be reduced to stable by drying prior to construction. Affects: points of change of different materials (shrinkage, plastic, liquid limits)
Porosity	Environmental	Determined by grading of earth particle and manufacture. The higher the density and the finer the grading, the lower the porosity.
Hygroscopicity	Environmental	Determines: erosion, absorption and penetration (dependent on expansiveness, porosity, density, grading, and fibre content) frost, condensation. Air moisture absorbed quickly vs. large quantities of liquid cause damage.
Thermal insulation	Environmental	Thermal conductivity increases in relation to material density (poor insulating qualities) Inability to prevent heat loss but ability to store heat and slow flow rate.

Appendix – Document 9: Interviews

INTERVIEW 1: NAJRIJ

Widow

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

Someone called Abou Maham Soltar but he is dead now {somebody from the area}.

2) Did you get these materials from around here?

Yes.

3) Is mud good for your needs?

Yes. Because in the summer is good and cool and in the winter warm.

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

There was no other material at the time. {Additional question about the age of the building} I do not know, I think it is over 100 years old, I came here to live when I got married; the house was my father-in-law's}.

5) Who taught you about the practicality of these materials {if appropriate}?

n/a

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

Yes, same material, same style.

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

The same.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

{She answers that the house is very good for the weather}.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

Yes, my father and grandfather but they lived somewhere else.

10) Do the houses of people in the village with the same job as you look similar to yours?

My mother's house, which is in the village, looks the same.

11) Can you give me an example of a house in your village that looks different to yours?

Some have built different houses, others houses like this one.

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

All the houses were like this in the past.

13) When building a house, do you think it is very important that it suits your particular needs?

{She answers that she does not know other houses}

14) Is it important for you that your house looks similar to others in the village?

If I had more money, I would make it look like the big houses.

15) If you could rebuild your house, would you do it in a different way now?

{Not answered}

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

It is an old house, not like the rest. In the past it was good.

17) Is it important for you that the animals live close to you?

Yes.

18) Do you use the same room for different things depending on the time of the year (Season)?

Sometimes I use the same room for different things, maybe I cook in the bedroom.

19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

Not a problem {it is ok for strangers to access different parts of the house}.

AREA 3 : "WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?

{There is no roof}. She uses the first floor for storage.

21) Where inside your house can you feel the air coming in?

n/a

22) Do you cook at the back of the house? In the courtyard?

{*not answered*}

23) Would you say there is a public and a private area in your house?

n/a

24) What is the use of your windows?

n/a

AREA 4: PRACTICAL QUESTIONS:

25) What would you say the most used room in the house is? What activities do you undertake there?

{She only uses one room}

26) Is there any areas in which you can perform certain activities but not others?

n/a {see 25}

27) Do you prefer reconstructing or repairing?

I would like to build a new house, different.

28) Do you spend more time in open or closed spaces within your house (and plot of land)?

In closed areas, in the room.

29) How do you keep cool in the summer? And warm in the winter?

I close the door and cover {in the winter}. In the summer I open the door and sit outside.

INTERVIEW 2: KOM EL ABIAD

Male, +- 50, owner's son

AREA 1: WHAT ARE THE KEY FACTORS THAT INFLUENCE THE CHOICE OF ADOBE AND ORGANIC MATERIALS WHEN BUILDING?

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

My father built it.

2) Did you get these materials from around here?

Yes, the materials are from the area.

3) Is mud good for your needs? *{answered jointly with 4}*

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

Everybody built like that in the past. The house has no defects. It is cool in the summer and warm in the winter. Everybody built like that in the 40s and 50s. It is comfortable to build with. The people that went to Iraq {Egyptians emigrated to other countries in the 70s looking for work} were rich when they came back and started building in red brick.

5) Who taught you about the practicality of these materials {if appropriate}?

Everybody built like that in the past. I do not mind whether it is practical or not, that is the only thing we can afford.

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

This was the house I lived in when I was a child.

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

When it rained a lot in the winter, we closed the windows and covered the house in polythene sheets.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

I do not mind whether it is practical or not, this is the only thing we can afford.

If I had money I would have the animal rooms separate, plus a bathroom upstairs and more storage.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

They did.

10) Do the houses of people in the village with the same job as you look similar to yours?

Mud houses look the same, even inside.

11) Can you give me an example of a house in your village that looks different to yours?

People with more money built red brick houses. Others that had money did not. I prefer the new ones.

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

Yes.

13) When building a house, do you think it is very important that it suits your particular needs?

I would build the house depending on how much money and space I had.

14) Is it important for you that your house looks similar to others in the village?

I can build it in whichever way I want. It depends {he does not say on what}

15) If you could rebuild your house, would you do it in a different way now?

I would prefer more furniture, cleaner, more space.

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

It is not suitable anymore for the village because it is too old. When I was young, all houses were like this so it did not matter, now I want a red brick house like rich people. We did not change the design in the house.

17) Is it important for you that the animals live close to you?

Yes. {Animals are outside and then they get into the stables through a side door}

18) Do you use the same room for different things depending on the time of the year (Season)?

Sometimes we use one room or another depending on which one is warmer {sometimes he sleeps in this room and his wife and children in a new red brick house he has built on the opposite side of the street}

19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

The guests stay in the guest room.

AREA 3: "WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?

I do not sleep upstairs because of the birds. There used to be people living upstairs but now they have a house of their own. They used to sleep in the rooms, not in the open-air {he is referring to the first floor and roof terrace, not to the roof as such}.

21) Where inside your house can you feel the air coming in?

Windows.

22) Do you cook at the back of the house? In the courtyard?

We used to cook in the clay oven {front room}. {Additional question about a possible chimney: We do not have an opening for the smoke to come out}.

23) Would you say there is a public and a private area in your house?

Nobody goes in the rooms where the grain is stored. Sometimes the storage room can be used as guest room {contradictory, presumably empty/spare storage rooms}. If there were female guests they would stay downstairs, the men upstairs. There are not any private areas because there are not that many rooms.

24) What is the use of your windows?

Source of air and light, otherwise it would be dark.

25) What would you say the most used room in the house is? What activities do you undertake there?

The living room. When guests come they would still there until late.

26) Is there any areas in which you can perform certain activities but not others?

The bedroom is for sleeping and the living room for hanging out.

27) Do you prefer reconstructing or repairing?

Moving to another place.

28) Do you spend more time in open or closed spaces within your house (and plot of land)?

{Unanswered}

29) How do you keep cool in the summer? And warm in the winter?

{Answered through question 7}

INTERVIEW 3: KOM EL NAGGAR

Elderly woman

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

Somebody else.

2) Did you get these materials from around here?

All the material is from the village.

3) Is mud good for your needs?

It is useful but now it has changed, they build red brick and columns. Everything changed but we did not.

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

When people bought the old houses they turned them into red brick {she does not specify when in the past}. We did not change because we did not have money. Everybody changed depending on how much money they had.

5) Who taught you about the practicality of these materials {if appropriate}?

{Not answered}.

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

{Not answered}

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

Yes {she does not appear to understand the question, she continues talking about red brick and how they would have built it like everybody else}.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

{She would not answer about improvements}. If I was not as old I would sweep and clean more around the house.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

Everybody in my family (grandparents...) but my sister built outside {she does not specify where} but with red brick.

10) Do the houses of people in the village with the same job as you look similar to yours?

All old houses were like that, streets were better. Everybody built in the size that was convenient for them. The rest of houses look the same (material, etc) only the size changes.

11) Can you give me an example of a house in your village that looks different to yours?

There are other different houses inside the village that are old but look different.

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

Yes.

13) When building a house, do you think it is very important that it suits your particular needs?

Yes.

14) Is it important for you that your house looks similar to others in the village?

I would build it differently but just so people do not think that I envy them {by copying their designs}.

15) If you could rebuild your house, would you do it in a different way now?

{some affirmative repetition of the question } I would build it in red-brick.

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

This house is traditional for old houses {she does not specify for the whole of Egypt, just "old houses"}. But other houses have one floor and they keep animals to eat them {breed}.

17) Is it important for you that the animals live close to you?

Yes.

18) Do you use the same room for different things depending on the time of the year (Season)?

No, each room for what it is: bedroom as bedroom, etc.

19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

The guests stay in the living room; I put a sofa or a carpet in the middle so they sleep there. They would not go to my room.

AREA 3: “WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?

I would go if there was something to cling onto {a handrail at the top of the stairs}.

21) Where inside your house can you feel the air coming in?

If you do not open the windows you do not get air.

22) Do you cook at the back of the house? In the courtyard?

I used to cook downstairs in the clay ovens. Nowadays I do not do it anymore, we use normal electrical ovens.

23) Would you say there is a public and a private area in your house?

{Refer to answer to question 19}.

24) What is the use of your windows?

Without windows it would be dark.

AREA 4: PRACTICAL QUESTIONS:

25) What would you say the most used room in the house is? What activities do you undertake there?

Living room and bedroom most of the time. I stay both upstairs and downstairs, but now only upstairs in my bedroom. My family could sit with me on my bed upstairs, cook and sit upstairs. Downstairs I use the clay oven and look for food and I finish cooking upstairs {contradiction with 22}.

26) Is there any areas in which you can perform certain activities but not others?

Animal and storage rooms.

27) Do you prefer reconstructing or repairing?

{Refer to answer to question 15}.

28) Do you spend more time in open or closed spaces within your house (and plot of land)?

I sit somewhere covered most of the time and upstairs.

29) How do you keep cool in the summer? And warm in the winter?

I put covers over the furniture (bed, sofas) to keep them warm.

INTERVIEW NUMBER 4: SURAD

Young female

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

No, somebody else.

2) Did you get these materials from around here?

Yes, from this area.

3) Is mud good for your needs?

Warm in the winter and cool in the summer.

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

In the past every house was like this.

5) Who taught you about the practicality of these materials {if appropriate}?

I do not know.

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

It was another distribution, but same material.

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

Another style for another climate.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

I want to build another one instead.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

They lived in this house.

10) Do the houses of people in the village with the same job as you look similar to yours?

Yes.

11) Can you give me an example of a house in your village that looks different to yours?

All the others look different.

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

Yes.

13) When building a house, do you think it is very important that it suits your particular needs?

{Not answered}

14) Is it important for you that your house looks similar to others in the village?

{Not answered}

15) If you could rebuild your house, would you do it in a different way now?

Yes, I would build a modern one.

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

No. They have new buildings now. In the past, yes.

17) Is it important for you that the animals live close to you?

Yes but I have no money and no space {there are no visible animals}.

18) Do you use the same room for different things depending on the time of the year (Season)?

Every room has its function.

19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

Here {where we are standing, would not normally be accessible to strangers}.

AREA 3: "WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?

n/a

21) Where inside your house can you feel the air coming in?

{Not answered}

22) Do you cook at the back of the house? In the courtyard?

In the kitchen.

23) Would you say there is a public and a private area in your house?

Nothing special {contradictory with answer to question 19}.

24) What is the use of your windows?

For fresh air.

AREA 4: PRACTICAL QUESTIONS:

25) What would you say the most used room in the house is? What activities do you undertake there?

The kitchen.

26) Is there any areas in which you can perform certain activities but not others?

No.

27) Do you prefer reconstructing or repairing?

I want to build another house.

28) Do you spend more time in open or closed spaces within your house (and plot of land)?

Open spaces.

29) How do you keep cool in the summer? And warm in the winter?

n/a

INTERVIEW 5: HISSAT ABBAR

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

My father had it built.

2) Did you get these materials from around here?

The materials are from the agricultural land and they brought them here and built.

3) Is mud good for your needs?

It is healthy. But water is a big problem in the winter.

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

All people used the same material in the past. There was no other.

5) Who taught you about the practicality of these materials {if appropriate}?

I do not know. My father did it, and I did not see it.

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

I lived here when I was little.

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

{No}, the same materials.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

Only that it was bigger and nicer. Two rooms and a bathroom in the bedroom.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

My grandfather's house was like this one, but I did not meet my grandfather.

10) Do the houses of people in the village with the same job as you look similar to yours?

Yes but maybe some other houses are more damaged {she asks for me to re-build the house for her}

11) Can you give me an example of a house in your village that looks different to yours?

People with other jobs have different style houses.

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

Same material, but maybe some changes in style.

13) When building a house, do you think it is very important that it suits your particular needs?

I do not know but I would like it to be like one of the new houses.

14) Is it important for you that your house looks similar to others in the village?

It is important, if we had money we would build a house in a new style.

15) If you could rebuild your house, would you do it in a different way now?

I do not know.

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

Yes, it is a traditional house.

17) Is it important for you that the animals live close to you?

It is important but I cannot have them {she cannot afford them}

18) Do you use the same room for different things depending on the time of the year (Season)?

Every room has its function, it is not interchangeable.

19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

The reception would be ok but where the bedroom would not.

AREA 3: "WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?

In the past we {anybody} used to use the two rooms in the first floor for sleeping.

21) Where inside your house can you feel the air coming in?

From the windows and from the stairs.

22) Do you cook at the back of the house? In the courtyard?

We have a portable oven and we move it to different rooms, bedroom... we cook everywhere.

23) Would you say there is a public and a private area in your house?

Nobody can go into the special storage room, and also the place with the birds because I am afraid that if somebody sees them they will die {the evil eye superstition}.

24) What is the use of your windows?

For the light and because in the past there was no electricity.

AREA 4: PRACTICAL QUESTIONS:

25) What would you say the most used room in the house is? What activities do you undertake there?

We hang around the reception most of the time.

26) Is there any areas in which you can perform certain activities but not others?

The oven is here, but apart from that you can do everything anywhere.

27) Do you prefer reconstructing or repairing?

{Not asked because of answer to previous questions explaining lack of economic means}

28) Do you spend more time in open or closed spaces within your house (and plot of land)?

In opening areas.

29) How do you keep cool in the summer? And warm in the winter?

In the winter we make a fire with some wood, and in the summer we do not do anything, maybe open the windows.

INTERVIEW 6: SA EL-HAGAR

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

Somebody else but I do not know who.

2) Did you get these materials from around here?

Yes, from the city.

3) Is mud good for your needs?

Yes. Because in the summer is good and cool and in the winter warm.

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

It gave very good health for people in the past.

5) Who taught you about the practicality of these materials {if appropriate}?

{Same answer as question 4}

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

{Not answered}

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

It is very good {he continues to talk about the advantages of mud}.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

I do not know. If I could, I would build a modern house.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

Yes, the same house.

10) Do the houses of people in the village with the same job as you look similar to yours?

The same style.

11) Can you give me an example of a house in your village that looks different to yours?

Some build different houses, some keep the same.

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

Yes.

13) When building a house, do you think it is very important that it suits your particular needs?

Yes.

14) Is it important for you that your house looks similar to others in the village?

I want to build in a new style.

15) If you could rebuild your house, would you do it in a different way now?

n/a

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

It is the oldest.

17) Is it important for you that the animals live close to you?

It is not important anymore.

18) Do you use the same room for different things depending on the time of the year (Season)?

{All questions from here onwards are not applicable because they only keep this house not to lose the plot of land}.

INTERVIEW 7: KOM SURAD (additional interview without survey)

1) Did you build the house yourself (or the first people that lived here) or was it built by a builder?

No, I bought it.

2) Did you get these materials from around here?

Yes.

3) Is mud good for your needs?

It is hot in the winter and cool in the summer.

4) Why is it good to use this material? Do you prefer these materials or {cite the ones that have not been used in this particular house}?

There was no other material in the past.

5) Who taught you about the practicality of these materials {if appropriate}?

I do not know.

6) Was the house you lived in when you were a child similar to this one (in external aspect, materials, space distribution)?

It had the same material but a different style.

7) Do you think if the climate was different (if it was colder, windier, with different day and night temperatures), you would use different materials?

The same materials.

8) What things do you think would make your house better? What resources could fit the function of your room if you had access to them {possibly give examples}?

We do not live in this house anymore {permanently}.

AREA 2: TO WHAT EXTENT IS THE FORM AND FUNCTION OF MUD AND ORGANIC BUILDINGS IN EGYPT DETERMINED BY SOCIO-CULTURAL FACTORS?

9) Do you know if your parents and your grandparents lived in houses which were similar to yours?

{Not answered}

10) Do the houses of people in the village with the same job as you look similar to yours?

No, they have different houses.

11) Can you give me an example of a house in your village that looks different to yours?

{Not answered}

12) Do you think the houses of people that lived in this village a long time ago would have been similar to yours?

The houses in the past were like this too.

13) When building a house, do you think it is very important that it suits your particular needs?

Yes, it is important.

14) Is it important for you that your house looks similar to others in the village?

It is not important that it looks the same.

15) If you could rebuild your house, would you do it in a different way now?

If I had the money, I would build in another style, this material is not modern.

16) Would you say your house is traditional of this village? And a traditional Egyptian house?

Yes, it is a traditional house.

17) Is it important for you that the animals live close to you?

It is important.

18) Do you use the same room for different things depending on the time of the year (Season)?

Every room has its function.

19) What rooms would be ok for a stranger to access and what rooms could not be shown under any circumstances?

n/a

AREA 3: "WHAT ARE THE DIFFERENCES AND SIMILARITIES BETWEEN ANCIENT AND MODERN MUD CONSTRUCTIONS?

20) Do you spend much time in the roof {if appropriate}? What sort of activities do you carry out there?

{N/a as the roof is not accessible}

21) Where inside your house can you feel the air coming in?

From the windows, doors.

22) Do you cook at the back of the house? In the courtyard?

In the kitchen.

23) Would you say there is a public and a private area in your house?

Yes, the bedroom is especially for me.

24) What is the use of your windows? *n/a*

AREA 4: PRACTICAL QUESTIONS:

25) What would you say the most used room in the house is? What activities do you undertake there?

The reception, which is used for visits and spending time.

26) Is there any areas in which you can perform certain activities but not others?

Nothing in particular.

27) Do you prefer reconstructing or repairing?

I would prefer to build another house.

28) Do you spend more time in open or closed spaces within your house (and plot of land)?

Open spaces.

29) How do you keep cool in the summer? And warm in the winter?

Nothing in particular, it is already cool in the summer and warm in the winter. In the winter we close doors and windows, in the summer we open them.

HOUSE SHA01 DELTA FIELDWORK					
HAB01	PLANLOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Second door of first corridor to left and back left	2	Unspecified	From corridor and from area to left of staircase)	
	Area under stairs	1	n/a	From corridor	Bird cages
ANIMAL AREAS	Within backyard	1	uncovered	backyard	Oven, some pots, mats, plastics. Right wall made of red brick
COOKING	In front of backyard	1	branches	From backyard	
SLEEPING	Right of corridor (back)	3	Beams and branches	From second corridor	There used to be other bedrooms upstairs, now floor destroyed
SOCIAL INTERACTION	First room on left?	1	Beams and branches	From first corridor	Room not accessed during survey
Other rooms	First corridor	1	Beams and branches (more irregular around stairs)	From main entrance	Sieves and other tools.
	Second corridor	1	Beams and branches	From 1st corridor	Chicken coop on right corner and also mud low wall forming small area in corner (animals) Pestle and mortar, paint...
	Back	1	branches	From backyard	Trunks, animal feeders (abandoned)
courtyards	Back (full width)	1	Uncovered		Bucket to wash clothes, clothes line, bird cages, right wall made of brick

Appendix – Document 10: Summary tables of features

KEB01	PLANLOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE					
	Roof terrace		uncovered		Many containers
ANIMAL AREAS	Back of ground floor	1	Beams and branches	From hall	
	Roof terrace		Beams and branches (irregular)		Hens, chickens
COOKING	Hall	1	Beams and branches	From main entrance	Oven, but it is also main entrance (pride on oven) Roof is grey with ash
SLEEPING					
SOCIAL INTERACTION	Left of entrance room (GF)	1	Wooden boards and beams	From hall	Could be from small table, some bottles?
Other rooms	Left of entrance room(FF)	1	Beams and branches painted	From roof terrace	Function?
	Right of entrance room(FF)	1	Beams and branches?	From roof terrace	Function?
	Right of entrance room (GF)	1	Beams and branches?	From hall	Function? In contact with animal shed next.
courtyards	none				

SUR01	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE					
ANIMAL AREAS					
COOKING					
SLEEPING	Left back	1	Beams and branches?	From courtyard	
	Left side of hall	1	Beams and branches?	From hall	
SOCIAL INTERACTION	central	1	Beams and branches	From main entrance	Also sink in cement/stone
	Right side of hall	1	Beams and branches?	From hall	Or bedroom?
Other rooms					
courtyards	Frontyard built with red brick around Backyard half built on red brick, with clothes line, utilities,etc				

KEN01	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Left of reception and left back	2		From reception and from previous	Any different previous functions?
ANIMAL AREAS	Right back	1	uncovered	From reception	Forming two floor patio but it is accidental after collapse
COOKING /ut					
SLEEPING	Left side (FF)	2		From roof terrace	1 abandoned, not accessible because of roof terrace collapse
SOCIAL INTERACTION	entrance	1	Beams and branches	From main entrance	Also containers, ladder,etc Also oven. Used as reception/living room
Other rooms	Roof terrace	1	branches	From staircase	Storage containers
courtyards	none				

NAJ03	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Only room FF	1	Beams and branches	From ladder outdoors	
	Left and right side (2 and 1)	3	Beams and branches (left side wooden boards and branches)	From corridor	
ANIMAL AREAS	Right back	1	Uncovered/branches	From corridor	
COOKING	One room that acts as reception and living room and where she can cook. The plan of the house has been altered by opening a new door and using that as main room. All the other rooms-perhaps previous bedrooms- are used for storage now.				
SLEEPING					
SOCIAL INTERACTION					
Other rooms	Corridor	1	Beams and branches	Gives access to all storage	
courtyards	At the back, with clothes. Uncovered apart from the low walled animal structures which are topped with straw; geese				

HOUSE of Hagras MARI GIRGIS (same building as house of Garas and Girgis)					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Between Hagras and Garas' houses (first floor)	1		From bedroom	For cereals
	Right back (ground floor)	1		From stable	For straw/tools
ANIMAL AREAS	Stables (ground floor)	2		One accessible from central courtyard (belonging to Garas), the other from 1st stable	
	Directly above straw storage (First floor)	1		From roof terrace	Storage of pigeon droppings
COOKING AND UTILITIES					
SLEEPING	Right side, first floor	1		From roof terrace	
SOCIAL INTERACTION					
Other rooms	Pigeonhouses Second floor		n/a	From staircase	At either side, forming pylons
courtyards	A central one shared with Garas and Girgis and with zir, kanun and staircase (leading to kitchen?)				
• Roof terrace					

HOUSE of Garas and Girgis MARI GIRGIS (same building as house of Hagras)					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Left back (ground floor and first floor)	2	Flat roof	From kitchen (downstairs) and From terrace (ups)	Square shape, straw at bottom and at harvest at top, which can also be used as children's bedroom.
	Left of entrance (ground floor)	1		From entrance area	silos
	Central before courtyard	1		From Garas' bedroom	Maize and wheat storage
ANIMAL AREAS	Behind courtyard (ground floor)	1	Matted reeds (bus)		Buffalo, cow, ass
	Left (ground floor)	1		From kitchen	goats
COOKING AND UTILITIES	Left centre (ground floor)	1		From courtyard	Oven and mud stove
SLEEPING	Left (first floor)	2	Flat roof	From kitchen	Each brother
SOCIAL INTERACTION	entrance	1		Main door	With wooden bench to rest (and soma or jar)
courtyards	Same as previous				
• Roof terrace					

HOUSE of Swagi Gayyed MARI GIRGIS					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Left back (FF)	1	uncovered	Directly from staircase	sawami
ANIMAL AREAS	Right of main entrance (GF)	1			
	Right of courtyard (GF)	1		Not separate from courtyard	Including ass feeder
	Behind main entrance			Not separate from entrance area	Small area for fish apparel
	Left of main entrance	1		Access from entrance area	Contains soma and pigeon holes.To keep straw
COOKING/UT					Oven and kanun in the courtyard
SLEEPING	Next to main entrance			Not separate from entrance area	Area where mother, father and baby sleep
	Left back (ground floor)	1		From courtyard	Bedroom of 4 girls and a child. Contains oven and kanun built during winter to keep the room warm
	Left (first floor)	1		From storage room	Child and wife, with cupboard and bed
SOCIAL INTERACTION					
courtyards	Straight from main door at the back, with oven and kanun during the summer and staircase				

HOUSE of Adli Masud MARI GIRGIS (only one storey)					
	PLAN LOCATION	NUMBER OF ROOMS	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Left back	1	Dry branches (bus)	From courtyard	For straw With sawami for grain
ANIMAL AREAS	Right back	1	Partially covered by bus	From courtyard (direct line from main door)	Gamousse feeder
COOKING AND UTILITIES	Left corner		Covered by bus with some thick trunk	Not separate from courtyard	Oven and kanun Another kanun located opposite corner, in front of stable
SLEEPING	Right, in front of main door		Covered by bus with some thick trunk	Not separate from courtyard	Area in front of main door
SOCIAL INTERACTION					
courtyards	Open area contains that takes up most of the plan includes: large area to the left, separate from 'kitchen area' by wattle and daub fence, chicken coop, rounded container for cereal, other larger containers for cereal				

HOUSE of Tawfig and Safig MARI GIRGIS (across the road from the previous ones, joined by storage room above street)					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Left back (ground floor)	1		From kitchen	Tools, fuel for oven, maize branches
	Extreme left (before courtyard, ground floor)	1		From kitchen	For straw
	Left corner (First floor)	1		From roof terrace	To store grain/also used by the mother to sleep
ANIMAL AREAS	Centre-Right back			From central courtyard	Ass, cow feeders
	Left of main entrance(not separated from central courtyard)	1	Dry maize branches (bus)	Main door	Cow, ass
	Right of main entrance (not separated from central courtyard)		Dry maize branches (bus)	From central courtyard	goats
COOKING AND UTILITIES	Centre-left of central courtyard (ground floor)	1		From central courtyard	Pigeon holes, oven and kanun (mud stove)
SLEEPING	Immediate after main entrance	1	Dry maize branches (bus)	Not separate	Dekka, protecting animals
	Right back (first floor)	1	flat	From terrace	Bedroom of couple and children Chest with woman's belongings
	Left back (first floor)	1	flat	From terrace	Bedroom of couple and children Much smaller than previous/ also used to keep cereals (container) and pigeonhole included
SOCIAL INTERACTION					
Other rooms	Pigeonholes (second floor)				Only one
courtyards	Central courtyard with staircase and water jar				

- Roof terrace (with container for chickens at top of staircase)

(note: 'bus' and 'falak': dry branches and most likely halved palm fronds)

HOUSE E. 4. 1	QURNA HASSAN FATHY ARCHIVE				
	PLANLOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Left-hand side of main entrance (right side of house)	1	Unspecified	First door left from main corridor (entrance)	From wooden shelves, wooden boxes/chairs, agricultural tools, stove
	Left side of the house (between two empty rooms)	1	Unspecified	From large open animals area	Use for storage of – specified in notes.
ANIMAL AREAS		2	Not covered		Different rooms goats/sheep
COOKING AND UTILITIES					
SLEEPING					
SOCIAL INTERACTION	Right-hand side of main entrance (right side of house)	1	Wooden boards	First door right from main corridor (entrance)	Also clothes hanger and washing bucket
	Contiguous to previous	1	unspecified	2nd door right from main corridor (entrance)	From cotton cushions + mat Could also be classed as 'sleeping'
	Left-hand side of main entrance (2nd)	1		2nd door left from main corridor (entrance)	From small wooden table, mats Could also be classed as 'sleeping'
Other rooms		2			Empty
courtyards	Central position to the right/ Left side at the back Frontal yard	3	uncovered	Directly from main corridor Directly from large open animals area From street?	Staircase included (that section covered) Empty, not described in notes Not described

HOUSE E. 4. 2 QURNA HASSAN FATHY ARCHIVE					
	LOCATION ON PLAN	NUMBER OF ROOMS	TYPE OF ROOF	ACCESS	NOTES
STORAGE		1	Bus and falak	From courtyard/another storage room	From bus. Also pigeons
ANIMAL AREAS	Left of entrance room	1	Bus and falak	From entrance room	Sheep
COOKING AND UTILITIES					
SLEEPING					
SOCIAL INTERACTION					
Other rooms	entrance	1	Palm leaves ribs		Empty
	Left back	1	Bus and falak	Access from courtyard	Only a small wooden table,Larger than any other room
courtyards	Middle-back	1	uncovered	Access from entrance room	

HOUSE E. 4. 7 QURNA HASSAN FATHY ARCHIVE					
	PLANLOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Extreme right side (on its own)	1	uncovered	From outside or from animals room	Wine storage?
ANIMAL AREAS	Left back	1	Uncovered	From contiguous animals room	Bread oven only Could be classed as courtyard
	Right back	1	Half uncovered/half wooden boards		Could be classed as half courtyard
COOKING AND UTILITIES					
SLEEPING	2nd room to the right of		Wooden boards		From two beds with cushions and mats,Cement tiles
SOCIAL INTERACTION	2nd door left of main door		Wooden boards	From entrance hall	Small table, chair, sofa with mats, coat hanger, small table, tea cutlery, glasses, gas cooker, other tools
Other rooms	Entrance hall	1	Wooden boards	Main door	From 1 wooden sofa, 1 wooden ladder, cement tiles Could also go in 'social interaction'
	Right hand side of entrance hall	1	Wooden boards	From entrance hall	Cement tiles
	Left hand side of entrance hall	1	unspecified		From wooden wardrobe, mat, wooden box, hanged clothes, washing bucket, scales, small table (bedroom/utilities-priced belongings?) Cement tiles
	Small hall with staircase, cement tiles, nothing there, access from entrance hall				
courtyards	None		* First floor rooms the same structure, hall without roof, empty, and all other empty rooms.		

HOUSE E.4 16	QURNA HASSAN FATHY ARCHIVE				
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE		1	Palm tree fronds and branches	From corridor contiguous to staircase area	From hay and oats Next to it small area without roof used to store hay
	Other side of corridor to storage room	1	Palm tree and branches	From corridor	From boxes,balalis,shelves, tools, rabbits
	FF (uncertain)	1	Wooden boards	Location uncertain	From 1 box, water containers, small containers, some tools
ANIMAL AREAS					
COOKING					
SLEEPING	Right corner, next to storage room	1	unspecified	From corridor	From 2 beds, wooden boxes, glass lamp and pipes
	FF (uncertain)	1	Wooden boards	Location uncertain	From 2 beds (1 iron,1 branches), wooden boxes, clothes hanger, small wooden table, rabbits
	FF (uncertain)	1	Wooden boards	Location uncertain	Bed, wooden shelves, wooden boxes
SOCIAL INTERACTION	Entrance (GF)	1	Palm tree fronds and branches	Main door	
Other rooms	Right of entrance	1	Half palm fronds +branches, 1/2bus+falak	From entrance room	Staircase, zir and clothes; 1st floor: small table, balalis, portable wooden ladder, wooden step
courtyards	Acting like a courtyard, but part of roof is intertwined with bus and falak (allows light through and some open) and this part has oven, another area is more for animals and is covered with bus and palm tree.				

HOUSE E.4 16b (same plan, just diff rooms of same house, mother of previous owner) QURNA HASSAN FATHY ARCHIVE					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE					
ANIMAL AREAS					
COOKING AND UTILITIES	Right back (GF)	1	unspecified	From corridor (previous house)	Mastaba, mat, gas stove, balalis, wooden boxes.
SLEEPING					
SOCIAL INTERACTION	Entrance (GF)	1	Palm tree fronds and branches	Main door	
Other rooms	Left back (GF)	2	Half open, half bus and falak (but with spaces)	From left courtyard	Empty
	Left of common entrance	2	Palm tree fronds and branches	From common entrance room From previous	First empty, second just a mat
courtyards	-Half open, half roofed with palm tree fronds and branches, with oven, central location (overall plan) -totally open, to the left of previous, with oven and balalis.				

HOUSE E.4 20 y 21 (two houses separate by animal rooms) 21 (largest) QURNA HASSAN FATHY ARCHIVE					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	entrance	1	Half covered with bus and falak	Main door	Wooden step, water container, balalis
			Palm tree and branches	From sleeping room with staircase	Crops storage
ANIMAL AREAS	Left hand side of entrance	1	uncovered	From entrance room	Bus and animals
	centre	1	uncovered	From sleeping room with staircase	Large room with bus and cattle
COOKING AND UTILITIES	Left back	1	Half with palm tree and falak	From corridor	Oven and gallon
SLEEPING	Right back	1	Palm tree leaves and branches	From entrance room	Branches bed, mat, mud tools, balalis
SOCIAL INTERACTION					
Other rooms					

HOUSE E.4 20 y 21 (two houses separate by animal rooms) 20 (smallest) QURNA HASSAN FATHY ARCHIVE					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE					
ANIMAL AREAS					
COOKING AND UTILITIES					
SLEEPING					
SOCIAL INTERACTION	entrance	1	Palm tree + branches	Main door	Wooden step with mat, w shelf
Other rooms	Right of entrance room	1	Palm tree + branches	From entrance room	Wooden step, balalis, wardrobe, lamps, tools
	Left of entrance room	1	Half with palm tree leaves and falak	From entrance room	Staircase, oven and other tools

HOUSE E.4 20 y 21 (two houses separate by animal rooms) animal rooms in between QURNA HASSAN FATHY ARCHIVE					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Hexagon with other rooms	1	Half with bus and falak		Wooden step,water and honey containers
ANIMAL AREAS	Hexagon with other	1	uncovered		Bus and animals
	Hexagon with other	1	uncovered		Chicken, bus
COOKING AND UTILITIES	Hexagon with other rooms	1	Palm leaves n branches		Wooden step, 1 honey container, tools, bucket to wash water
	Hexagon with other	1	Bus but open spaces		Bus, small table, wood for fire

HOUSE E.4 23	QURNA HASSAN FATHY ARCHIVE				
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Second right of courtyard (GF)	1	Wooden boards and branches	From courtyard	Crop storage, cheese, wooden boxes.
	Unspecified (FF)	1	Uncovered	Location unspecified	bus
ANIMAL AREAS	Left back (GF)	1	Wooden boards and branches	From courtyard	Wooden door only used for animals
	Third right of courtyard (GF)	1	Palm leaves and falak	From courtyard	Chicken and hay
COOKING/ut	Unspecified	1	Palm leaves and falak	Location unspecified	From oven, gallon, kitchen tools, cal
SLEEPING	Behind reception (GF)	1			From branch bed, clothes, mats, cushions Could also be classed as social interaction
	Unspecified	1	Wooden board and branch	Location unspecified	From iron bed with mattress, branch bed with mattress, mat, w box, cloth bukect, candle, small table, gas cooker, sheet of glass, chair, w wardrobe, clothes in hanger, pictures, cal.
	Unspecified	1	Wooden board and branch	Location unspecified	2 Wooden dekka with matrresses
	Extreme left (GF)	1	Wooden board and branches	From second staircase room	From Iron bed, mattresses, mat, wooden wardrobe and box
	Extreme left (GF)	1	Wooden board and branch	From previous	From Mattresses, wooden boxes, corn, iron bed
	Unspecified (FF)	1	Wooden board and branch	Location unspecified	From iron bed, mattress, wooden box, corn, coat hanger with clothes
SOCIAL INTERACTION	Entrance (reception) (GF)	1	Wooden boards	From main door	From two steps with mats and cushions, wooden chairs. Also cement tiles
Other rooms	Right of reception (GF)	1	Wooden boards and branches	From street or from bedroom	Clothes only Red brick floor
	First right hand of courtyard (GF)	1	Uncovered	From courtyard	Staircase Balalis and chickens
	Extreme right (GF)	1	Wooden boards and branches	From staircase room	Wardroe, dekka, table, tools, gas cooker
	First left of the courtyard (GF)	1	Half palm tree and some branches, half uncovered	From courtyard	Staircase, nothing else
		1	Palm tree and branches	From previous	Staircase, candle lamp, tools

HOUSE 1 BASHENDI – W Schijns					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Right back	2	Beams	From reception room	
					Water jars
ANIMAL AREAS	Next to left courtyard	1	unspecified	From kitchen or courtyard	Chicken pen
COOKING AND UTILITIES	Left back		Uncovered (partial shade)	From little area before/from women reception	
SLEEPING	Behind women's hall (GF)	1	beams	From women reception	
	Above storerooms(FF)	1	beams	From upstairs corridor area	Also acting as a store
SOCIAL INTERACTION	Main entrance (GF)	1	Beams	From main door	
	Middle of GF	1	Beams	From main reception	
	Left of main entrance	1	Beams	From main reception	
	Above main reception room (FF)	1	Beams	From	Used as living room
Other rooms Bathroom (GF), compost toilet (GF), dry toilet (FF)	Next to central staircase Next to left staircase and above previous	3	Beams Beams beams	From women reception from garden from roof terrace	Compost room toilet and dry toilet are on top of each other and related
courtyards	With trees, on the left hand side				

HOUSE 2 BASHENDI – W Schijns					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	In front of main entrance,right back	1	beams	From reception room	
	Left of entrance	1	Unspecified (beams)	From corridor	
ANIMAL AREAS					
COOKING AND UTILITIES					
SLEEPING	Central back	1	Unspecified (beams)	From reception room	Also used as a store
SOCIAL INTERACTION	main entrance	1	beams	From main door	reception
courtyards	Communal courtyard shared with other three properties				
• house was part of an ezba • only one floor • two mastabas, front and side					

HOUSE BALAT – W Schijns					
	PLAN LOCATION	No.	TYPE OF ROOF	ACCESS	NOTES
STORAGE	Right of entrance	1	Beams (flat)	From entrance room	
	corridor			From l/room /winter kitchen	Underground store within the 'corridor'
ANIMAL AREAS	Roof terrace (FF)				Chicken pen
COOKING AND UTILITIES	Left back (FF)	1	Beams (flat)	From roof terrace	Summer kitchen (winter kitchen in reception room)
	extremeleft back (GF)	1	uncovered	From 'corridor'	Bread oven
	Annexe of summer k	1	Beams (flat)	From summer kitchen	scullery
SLEEPING	Left back (GF)	1	Beams (flat)	From 'corridor'	
SOCIAL INTERACTION	Centre (GF)	1	Beams (flat)	From entrance room	Living room/reception room, largest room, staircase with cupboard. Also serves as winter kitchen
	Above main entrance (FF)	1	Beams (flat)	From roof terrace	Living room
Other rooms	Right back (next to bedroom)	1	Beams (flat)	From 'corridor'	
Bathroom					
courtyards	none				

- light wells in roof terrace
- fully connected to house next door, store in neighbour's ground floor is wall to wall with entrance of this house, neighbour's roof terrace next to upstairs living room.
- Storage bin on roof terrace
- Roof terrace with wattle and daub (according to author, concentric arrangement from private to public, diff summer/winter, men/women)

DELTA – 5 HOUSES			
	Location	Roof	Access
Storage	Number of locations: sides of reception, at back, top floor either roof terrace (just containers) or room	Beams and branches	Depending on location
Animal areas	Always at the back, usually courtyard	Uncovered/bus and falak or branches (with gaps) 1 case of beams and branches: stables	From reception or from corridor (also from within courtyard)
Cooking utilities	No specific room just for cooking in most cases, oven can be in reception/living room, also in courtyard	Bus and falak	Usually from main entrance because of reception
Sleeping	Both ground and first floor, both sides	Beams and branches	From hall/corridor (courtyard in 1 case)
Social interaction	Hall immediately at entrance and/or rooms on the side	Beams and branches or wooden boards and beams	From main entrance
Others	Same as sleeping rooms (some of them are just corridor or roof terrace areas)	Beams and branches	Empty/function unknown or variety of tools
Courtyard	Uncovered, 3 at the back, 2 inexistent. Usually to wash clothes, some bird cages, often rebuilt in red brick, only 1 frontyard (red brick), often areas for chickens, geese... which are often roofed with branches		

MARI GIRGIS – 3 HOUSES			
	Location	Roof	Access
Storage	3 out 4 houses have storage at left back in ground floor; in another two instances it is located at the left back of the first floor.	The 2 types of roofing are found (solid beams and loose branches) as well as unroofed.	The most frequent access is from the kitchen
Animal areas	Always ground floor but variety of locations; normally either at the back or next to entrance	Most commonly covered by dry branches	The most common access from courtyard or from main entrance
Cooking utilities	3 types: 1 no specific room, 1 facilities in courtyard area, 2 separate rooms		From courtyard when there is room
Sleeping	First floor (different areas) or close to entrance		various, or from main door
Social interaction	Only in 1 case there is a reception		
Others	Only one house with pigeonhouses		
Courtyard	2 out of 3 courtyards have kanun and staircase there, but they are not in the same location		various

QURNA – 6 HOUSES			
	Location	Roof	Access
Storage	Various locations in both ground floor and first floor, no predominant location within floor but ground floor more common	Various, from uncovered, to partially bus and falak, palm fronds and branches and wooden boards and branches	Variety: most common from courtyard. Also from corridor, from main entrance, sleeping room, animal room
Animal areas	Variety of locations on ground floor	Most uncovered; bus and falak, palm leaves and falak, boards and branches or partially covered with wooden boards	From courtyard or from entrance room
Cooking	Absent in most (1 left back first floor 1 right back ground floor, 1 unspecified)	Half palm tree fronds and falak or palm leaves and falak	From corridor/unspecified (first floor)
Sleeping	Absent in half, most in first floor, or close to reception on ground floor	Wooden boards, wooden boards and branches or palm tree leaves and branches	From corridor/entrance room
Social interaction	Entrance or at both sides of entrance in ground floor	Palm tree and branches, wooden boards,	From main corridor/entrance/main door
Others	A number of unspecified rooms, variety of objects, many empty, some are for staircase, these ones...	Usually half covered (bus and falak or branches)/half open, with other containers...	
Courtyard	Front, left back, central back, left, right, ,central (overall)	Uncovered or partially covered with bus and falak	Two of them with oven

DAKHLEH – 3 HOUSES			
	Location	Roof	Access
Storage	Right back of ground floor or right back of entrance (1)	beams	From reception room, from entrance room (1)
Animal areas	Different in each: ground floor next to left courtyard, roof terrace in first floor (just chicken). 2 of them do not have room as such	unspecified	From kitchen or courtyard
Cooking utilities	Left back of ground floor (2) and first floor (1) (one house with 2)	2 uncovered (or partial shade) and one with beams	various
Sleeping	Variety of locations ground floor but at the back, only 1 case of first floor front	All beams	From reception or from corridors
Social interaction	Main entrance or surrounding areas, or main entrance same location first floor	All beams	From main door or from main reception
Others	Utilities bathrooms (2) and toilet (1)	All beams	From kitchen From bedroom or women reception, from roof terrace
Courtyard	Shared with other properties, none or left hand side.		various

Appendix – Document 11: Description of architectural features[7]

GIZA

External finishes

Roofs: No evidence preserved.

Walls: All walls described by Hassan had a 3-4cm thick dark yellow plaster.

Doors: A number of houses show evidence of entrance doors having being bricked up.

Windows: No evidence preserved.

Features: No evidence preserved.

Internal finishes

Ceilings: No evidence preserved.

Walls: Remains of paint in the form of horizontal bands of black, white and red were found in house M; other houses had whitewashed or black walls.

House F and E in its later phase had pilasters forming a niche that occupied the width of the room (rooms 71 and 129).

Walls were originally made of large, silty bricks but were then replaced in places by small, reddish bricks (Tavares 2008, 12).

Doors: Several doors were found bricked up in house D.

Windows: No evidence preserved.

Others:

<u>Floors:</u> Raised floors of limestone debris, 40 cm higher than surrounding rooms, were found in rooms 129 and 130, and northern areas of 133 (however, it is unclear

[7] This description refers to the sample houses (see Fig. 2.2) and extends the information described in tables 4.1 to 4.11. Nevertheless, where information from nearby houses was relevant, it has also been included here.

whether this limestone debris refers to the original floor or the rise is caused by the collapse of other features).

Ovens: Remains of an oven placed against the southern wall were found in room 130 of house K.

In house E, there was evidence for several hearths against the eastern wall of room 69.

A mud fireplace was found in the central room of house C.

Storage: House B contained a circular granary, while house E in its later phase contained five circular bins according to Hassan (1943, 38) and four silos or granaries made with small bricks according to Tavares (2008, 12). Both of them were located near an entrance door, in the first case near the southern and in the second near the northern (all houses have a southern and a northern door; however it is not clear which door is the main entrance).

KAHUN

External finishes

Roofs: Western houses: wooden beams with poles on top and bundles of straw or reeds tied to them. Mud plaster inside and outside/ barrel vault. Walls: No evidence preserved.

Doors: Petrie only described the external doorways in the case of the five large houses, which were of a ‘moderate size’ and were supported by a half-round stone lintel.

Windows: No evidence preserved.

Features: Drainage barrier built with stone and running through the middle of several streets.

Internal finishes

Ceilings: In one room (unspecified where) a wooden beam approximately 9cm thick by 9 cm high and 2,4m long was found, with marks of other pieces across. In certain instances of the smaller houses, ceilings were made from a barrel vault (Petrie 1890, 23).

Walls: The bricks would have been made with a wooden mould, producing bricks of dimensions 28-30.5 x 12.5-15 x 7.5-10 cm, data confirmed by the finding of a wooden mould on site. Wooden cramps were used for securing stonework (Petrie 1890, 26). Walls were plastered. The inner walls of the most important rooms in the house were commonly plastered with mud and painted with a dado. The surface was plastered smoothly; the lower area (90cm -1.5m) from the ground was then painted in black or a dark colour, while the upper part was coloured in yellow. These two areas were separated by a decoration of red lines on a white ground.

Doors: All doorways preserved in the western workmen's houses were arched over, with bricks separated by chips of limestone.

The houses were fitted with wooden doors and in many cases wooden frames. Door bolts, both single and double, were also discovered (Petrie 1890, pl. IX, fig. 21). All bolts slid through a tenon into a wooden block which was secured with a pin near the edge of the door. In the case of single doors, the bolt slid through one block and straight into the wall, while double bolts passed through two blocks. One of these double bolts was cut from one piece of hard wood, being flat on one side and rounded on the other. A wooden key was also discovered.

The thresholds were also wooden and provided with a hole as pivot socket or a separate stone pivot socket.

Windows: No evidence preserved.

Others:

<u>Floors:</u> The floors preserved were made of a layer of clay.

<u>Columns:</u> In the western workmen's houses, the evidence for columns was stone bases, which were generally 51-61cm at the bottom and 43-53cm at the top. These bases had octagonal marks, and remains of a wooden column were found. The columns, or at least the bottom of the columns, had a diameter of c. 25. 5 cm.

In the large five houses, there were remains of wide and flat stone bases, presumably for wooden columns. In addition, octagonal stone columns, eight ribbed or sixteen fluted and with abaci, brackets or palm leaf capitals were also recorded.

Staircases: Many steps were still preserved in Petrie's time; the ones that had been sufficiently preserved in the western houses were dog-legged, with each flight having five or six steps, each one of them being 63.5-71 cm wide.

Storage: In many rooms conical storage bins were found, built with single bricks laid on their sides, and plastered with mud on both sides. They were often found in pairs. In one case, the floor on the side of a granary was made of stone slabs and had a raised border.

In addition, mud containers, with small holes and a sliding door (of unspecified material) were found.

ELEPHANTINE

External finishes

Roofs: The only roof remains in the sample were found in yard C of H25a, where a large amount of vegetal particles was found in the strata, most likely belonging to a light roof.

Walls: In H25b, the bricks were made from the same Nile mud as can be found in the settlement layers, and accordingly had a high proportion of sherds, charcoal and organic tempering. Fist-sized jar seals, large pieces of glass and brick fragments were also used in wall construction. The type of bonding could not be determined.

The outer corner of M42 and M68 in H12 and the diagonally opposite corner of H 18 were reinforced with a wooden post, its base incorporated into the masonry bond. Several stone slabs were placed in the outer corner of M42. In M57 and M68, the mortar joints were filled with pieces of pottery. The bricks used in M42 were larger than the ones used in M57.

Examples of plaster were only found in the oldest stage walls (M 198, 164, 163 and 197) of 25b and this was thick and compact. Traces of white lime paint were also found on the south side of M 163.

Doors: In H10, the main entrance still preserved part of a threshold.

Windows: No evidence preserved.

Features: No evidence preserved.

Internal finishes

Ceilings: No evidence preserved.

Walls: Wall M114 of H25b was plastered carefully on the east side.

All walls of H10 were built with the same bricks. The joints at the sides are reinforced with mortar.

Wall M62 of H12 had significantly smaller bricks than other walls. Both M62 and M63 had a mud plaster of good quality. On the north area of M63, there is a yellow rectangle painted on the plaster, 20 to 52cm above the floor and 37cm wide.

In H86b, the northeast corner of M 967/968 (room D) was built of bricks marked with an up to c. 5cm-deep finger impression on the surface.

The internal walls of H86b had two different colours and textures: the presumably older ones were grey and muddy, with ashy mortar (M 848, 889, 953, 867, 906, 963 and 964). The others were yellow and sandy.

In phase H86a, wall M952 was measured as being one and a half brick thick.

In H86b, the walls of corridors B and C were covered with roughly-cut stone slabs (mainly red granite). The only slab preserved in situ was located at the southern end of the preserved part of wall M953. This slab was partially inserted in the receding, irregular wall and smeared with thick layers of mortar. A series of bricks found below may have been used as a base for the slab panels. On the opposite walls, M852 and 883, the slabs were placed over straight, plastered walls. The corners of the corridors were plastered with mud, giving them a rounded aspect.

Doors: Room D of H25b had a stone threshold.

The area that communicated room C (the courtyard) with room F in H25b had several roughly-worked stones (red granite), which probably served as thresholds.

In H86b, in the area that gave access from space H to K there was a 11x6cm deep recess in the masonry, plastered with mud all around. It was possibly the space for a timber that acted as the western jamb.

The access between F and G in H86a had a brick threshold with steps. There was also a difference in level between the two areas.

In H10, a stone pivot socket was found in M55, in the corridor between room A and C. In room A itself, there was also a flagstone used as a threshold.

In room D of H12, a wooden sill and a stone pivot socket were found in situ.

Windows: No evidence preserved.

Others:

<u>Floors:</u> Evidence of floors was found in 86a, where footprints had been preserved on a mud surface, and room F of 86b where eight tiles of a compact floor were found.

<u>Columns:</u> The only remains of a possible column found in the sample were in room C of H10, suggested by a hard pink mortar of octagonal shape on the floor (Von Pilgrim 1996, 215).

A room with a central column is found in houses with different floor plan layouts across the site, which are not included in the sample.

<u>Ovens:</u> A large oval hearth was found in the center of Room A of H25b, as well as remains of an earlier oven.

In room F H25a, the remains of an oven, which was located in the centre of a room and surrounded by standing stone slabs were found, as well as some whole burnt bricks on the highest level of ash deposits.

Staircases: In none of the houses in this sample were there any staircases; in fact, only a few houses in the entire settlement have stairs.

Apart from H70, the only other house of its kind that had a staircase was H93b (Von Pilgrim 1996, 211). The stairs were constructed with an arched substructure under which a small chamber was created.

Only two flights of stairs were still preserved well enough for original steps to be identified (H68, H70). In H68, the steps appeared to be 40 cm deep, with a total length of 7.80m.

In H70, only the first steps of the lower section remained. The mark of the staircase extended approximately 5.10m, and the remaining steps had a depth of 30cm. Both the first run of stairs (a very short one) and the second one were built with sandstone, probably former thresholds.

Storage: On the west wall of the courtyard of H25a, there was a square brick masonry structure, with remains of a wooden frame. Its design resembled a similar shaft-like storage space in H84b, which was used for grain storage. In addition, an oval pit with remains of a large number of jar seals was found north of a meal platform.

In the middle area of the courtyard of H10, a small circular storage was dug.

A small storage space and two silos were found in the northeast area of the courtyard (e) in H86b. The floor of both silos was made with sandstone slabs and they were plastered with mud on all sides. In addition, the inner walls of one of the silos were lined with standing stone slabs, partly integrated into the masonry. On the outside, both stores had a coating of mud on all sides. It consists of compacted sand with a high proportion of vegetable particles; one of the coatings also had high ash content. Lastly, there were three small circular storage structures in the middle of the courtyard. In phase 86a, two other small mud structures were found, as well as a deep rectangular silo, plastered with mud.

Buried pots: Below floor level in room C of H10 here was a circular depression in the floor about 20cm deep, backfilled with fragments of mudbrick.

TELL EL DABA (F/I)

External finishes

Roofs: Evidence of roofs was found in the form of thick pieces of mud with mat imprints found lying on the floor.

Walls: Both the perimeter surrounding the houses and the house walls shared the same characteristics, being built with mudbricks of an ashy sand-clay mixture, greenish, yellow and grey colour. However, while the dimensions of the perimeter bricks were 39-40 x 18-19 x 7 cm, those of the houses were of about 35-37 x 18 x 7-8 cm and therefore slightly smaller. Both the perimeter and the house walls are bound with a very sandy mortar, often filled with pure sand or clay. Their brick format varied within certain limits. In a single house in grid square N/19 (from phase I / 2) bricks of the following dimensions were observed: 38-39 x 19-20, 37 x 18-19, 35x17, 33 x 17. In some houses, a plaster made of a coating of mud or broken bricks could be found, as well as some small remains of whitewash.

In Phase I / 3 of N/19, one to three-brick courses could be found below the wall masonry, of bricks that were slightly larger and denser, the mud being bluish. They were positioned between the joints of pure sand bricks. In one case, the bottom brick layer extended across the walls of several houses across the street.

Doors: The doorways were narrow, about 60-80 cm wide. There were no remains of stone except for pieces of limestone hinges, which showed a single hole and were badly eroded, such as that found in house 4. Occasionally there were two or three holes in these blocks of stone.

Exterior doors have considerably high thresholds. The streets of the area are partly higher than the house level, in some places up to 10cm. Some doors are bricked up to four courses.

In a house in l/20, there was still a limestone threshold and a stone pivot socket placed in situ, belonging to a door that faced an alley.

Windows: No evidence preserved.

Features: No evidence preserved.

Internal finishes

Ceilings: No evidence preserved.

Walls: In some houses across the grid there is a coating of mud made of broken bricks. In n/17 for example, in particular, remains of mud plaster were only found in one back room. The plaster was a mixture of clay and sand, similar to the brick material. Some walls were blackened by the effect of smoke.

Doors: Approx. 100cm above the threshold of the phase I / 2, a stone pivot socket of the Phase I / 1 was found in situ. There was evidence of bricked-up doors in several houses. A stone pivot socket of a secondary door was still located in situ in o/20. The interior doors reached the floor level, without the need for a threshold.

Windows: No evidence preserved.

Others:

<u>Floors:</u> The floors were made of pounded sand or clay with ashy deposits. In particular, two rooms in in n/19 and o/19 had floors entirely covered in ash. In houses 2 and 3, all excavated rooms had a pavement of brick rubble. A further paved area was also found in home 4.

<u>Ovens:</u> In a house in j/21 a corner of the main room had a walled-in quarter circle used as a furnace, which was filled with charcoal ash. The remains from a bread oven from phase I/1, were also found in a courtyard in o/20. In the Northeast corner there was a small oven assemblage with a c. 45cm-diameter plate and cylindrical bread moulds.

<u>Storage:</u> In the houses south of the alley there were several small structures, including a small round silo (Czerny 1999, 24). A secondary structure, presumably a silo (although it could also be a rabbit hutch or manger), was found in the SE of the courtyard which took up the space where houses 6 and 8 used to be.

<u>Buried pots:</u> A round pit where a storage container used to stand was found in the courtyard of a house.

A series of pits, such as the rectangular mark found in the courtyard in house 6 probably showed the location of water vessels (Czerny 1999, 23). Near the western edge of N/19, in a small ante-chamber, there was also a 45cm deep and 50 cm diameter pit. It was lined with a 15-20 cm-thick layer of rich clay and reinforced with bricks on the sides.

Another example of a pit, from phase I/2 was found in a rear courtyard in m/20. It had a large container buried in it, in a way that meant that the mouth of the vessel was about 25.5cm or less above the floor.

In o/20-21 a pit was built with stone and brick and lined with sherds of broken brick (although it might have been a fire pit instead of a water vessel mark (Czerny 1999, 28)).

LISHT

External finishes

Roofs: During this period, there is said to be evidence to suggest that room C of A.3.3. was covered with a light roof of tamarisk beams and reed, although the exact evidence is not given (Arnold 1996, 19). Roof F had a more substantial roof plastered on both on the upper and the underside.

Walls: The southern wall of this house was oriented at an oblique angle.

Doors: There was an imprint of a limestone pivot socket in the entrance doorway of A.1.3.

Windows: No evidence preserved.

Features: A small storage bin on the outer face of the southern wall of A.3.3. was found completely filled with grain.

Internal finishes

Ceilings: Remains of a vault were found in chamber (n) of A.1.3. (Arnold 1996, 17).

Walls: The walls of room h of A.1.3., preserved to 1.70m were plastered and painted, 85cm in black, and yellow, separated by a white line. The entrance chamber doorway and the antechamber were similarly painted.

In A.3.3., some walls were preserved up to a height of 2.70m. There were some small fragments of painted plaster in the living room (b) with similar colours to the ones described for room h of A.1.3., the only difference being that the lines separating the black and yellow sections were black, white, red and brown stripes rather than only a white line. The plaster in the private chamber (e) did not have decoration.

Doors: In the southwest corner of hall h in A.1.3., there were remains of a limestone doorframe. A doorway which would have originally connected rooms b and c of A.3.3. had evidently been blocked at a later date.

Windows: A small opening was found in the lower portion of the vault in the southern wall of room n of A.1.3. In addition, in the north wall of rooms b-c and d slanting windows were located about 3 m above the floor.

In the dividing wall between b and c in A.3.3., a small window was discovered with a wooden bar still in position.

Features:

Floors: Below the floor level of the living room of A.3.3. several large, flat fired bricks were discovered, which probably served as a foundation for a now lost pavement (Arnold 1996, 17). Similar tiles were found in A 2.1 to pave the steps of a staircase.

There is evidence that, at one time, the floor, platform and all walls in room e had been whitewashed. This evidence was covered by a thin layer of fine sand and a later mud floor above.

Pillars: In the hall h of A.1.3., the square marks of presumably two equidistant pillars were found (Arnold 1996, 17). Similarly, two equally spaced shallow pits in the bedrock in room b-c of A.3.3. suggest the position of wooden pillars or columns (Arnold 1996, 17).

Staircases: The identification of staircases in A.1.3. and A.3.3. is not certain. In A.1.3. some unspecified remains were found in corridor e which could be identified as belonging to a staircase (Arnold 1996, 15). In A.3.3. their existence was suggested although no evidence was provided. A stepped structure was built in the southeastern corner of room c, with a height of only 0.5m, but was ruled out as a staircase (Arnold 1996, 19).

Storage: In a cornered courtyard of A.1.3. a bin was located.

DEIR EL BALLAS

External finishes

Roofs: Evidence for roofing was found in the form of alluvial mudbricks and mudbrick rubble that contained reed and grass impressions, in association with reeds and palm matting. A portion of hardened plaster layer was also found attached to the mudbrick rubble. Remains of an acacia beam were found in the trench profile and traces of others on sand and gravel. In room 5, alluvial mudbricks of approximate dimensions 35x16x10cm were found, in addition to rubble mixed with charcoal, wood and bark fragments.

Walls: Remains of walls were found as deposits, which averaged 130 cm in depth, in room 5a and area E1. The remains of the collapsed walls consisted of alluvial mudbrick and rubble, found beneath gravel, flint chips and small pieces of mudbrick.

Doors: No evidence preserved.

Windows: No evidence preserved.

Features: No evidence preserved.

Internal finishes

Ceilings: A semicircular fragment of acacia bark measuring 6x6cm was found in room 5a, with remains of marl mortar. In addition, an approximately 12-14cm diameter and 1.8m acacia beam was found.

Walls: No evidence preserved.

Doors: In the west wall of room 2, remains of a bricked up doorway were found.

Windows: No evidence preserved.

Others: No evidence preserved.

<u>Storage:</u> A 105cm x 75cm storage bin was found in room 5a, fixed to the north wall. It was made of mudbricks measuring c. 22x15cmx10cm.

<u>Columns:</u> A limestone column base was found in room 5a, 10-45cm above the mud plaster floor. In room 3, three bases were found, two of which were pierced; the other one had a rectangular bone inlay.

<u>Floor:</u> Below the southeast corner of the east wall of room 5a, the plaster floor was exposed. This floor was formed by three layers: a layer of mud plaster with small pebbles, a marl plaster also mixed with small pebbles and a deep layer of gypsum and gypsum mixed with fine sand. This floor was also found in rooms 2, the south corner of E1 and south section of E2.

<u>Staircases:</u> Five steps of a staircase were found in room E1. Each tread was approximately 20cm and each rise 14 cm.

Evidence of the presence of a staircase is found in the southwest corner of the 'courtyard' where prints of the remains of the bottom two steps are visible in the stairway and in the courses of bricks which were at the level of the bottom step, adjacent to the east end of the crosswall. This was also evidenced on the floor, where a protuberance indicated the place where the plaster was smoothed up against the stairway and the crosswall (Lacovara 1990, 9).

There is tentative evidence for another staircase between E1 and E3 (Lacovara 1990, 10).

TELL EL-DABA (A/V)

External finishes

Roofs: No evidence preserved.

Walls: The wall thickness of house 032-033 is of a single brick. The eastern wall of house 056-059 was a brick and a half thick and included a limestone pounder embedded in a crack. The bricks were made of compact, hard clay, with dimensions 46-47 x 18-19 cm. The bricks were put together with a stretchers bond. The north and south walls of the building were also of the same characteristics, although the dimensions of the bricks in the latter were 46-47 x 18-19 cm.

House 081-083 was built of mudbricks of different size and consistency. The north wall was originally two brick thick. The bricks were silty (with majority of particles of a size between clay and sand), green-grey to ochre in colour, with dimensions 42 x 18-19 cm. A newer construction phase of this north wall was a single brick thick and built with large mud bricks (45 x 18-22 cm), of crumbling consistence. The east wall was a single brick thick, with bricks of green-grey colour and dimensions 36-37 x 18-19 cm; it replaced a previous wall which was two brick thick. The west wall in the earlier phase was a brick and a half thick, with silty mudbricks of green-ochre colour and size 43-44 x 18 x 7 cm. This wall was later replaced by a single brick thick wall, c. 12.5-25.5 cm further away. The bricks were 38 x 18-19 cm and 41 x 20 cm. The south wall was a brick and a half thick, with bricks made of dense clay, of dimensions 40-45 x 18-20 cm and particularly compact in the SW half, with dimensions 48 x17 and 42 x 18 cm. The eastern section of the wall was a brick and a half deep, made of light silty clay of dimensions 37-38 x 20 cm. The west wall of this small space is a brick and a half thick, made of strong silty bricks, 35-38 x 17-20 cm, laid in a stretchers bond.

Only the bottom courses were preserved in the west wall of house 092-093, which were formed by compact, loamy mud bricks on end of dimensions 40 x 11-12cm, and 32-36 x 12-13cm. The east wall was a single brick thick, of hard mud bricks and laid regularly. The west wall was not entirely preserved, only irregularly, it was between half and one brick thick. The south wall was a single brick thick, built with hard clay bricks, of dimensions 39 x 15-17cm and 40-43 x 10-12cm for the brick on edge. The brick walls were made of the earlier hard clay, with dimensions 40-43 x 8-13 cm. The eastern part of the wall course was interrupted by four bricks laid transversally, one and a half brick thick (c. 75cm).

The south wall of house 173-176 was one and a half brick thick (c. 73cm) with bricks of size 48 x 17-18 cm. The east wall was one and a half brick thick (60-67 cm wide) and built from light silty clay, with brick dimensions being 40 x 17 cm. The west wall was a single brick thick (49 cm wide, brick sizes: 41 x 20 and 48 x 17 cm). The north wall was one and a half brick thick, with brick dimensions being 47 x 39 x 18 cm and 47 x 19-20 cm.

Doors: In house 032-033, there was evidence of a bricked up doorway (95cm wide). A second door was probably at the south end of the partition as there was a possible one and a half brick thick threshold (Hein and Jánosi 2004, 66).

Windows: No evidence preserved.

Features:

<u>Storage:</u> Storage constructions tended to be located between houses, outside the actual living structures, e.g. 051, located east of house 056-059.

Internal finishes

Ceilings: No evidence preserved.

Walls: House 032-033: the foundation of the dividing wall between 032 and 033 was one and a half brick thick, with a brick size of 38 x 18 cm. The wall itself is a brick thick, with bricks of dimensions 41 x 20 cm. All walls were preserved up to a height of three courses.

Doors: House 081-082: On the access between 081 and 082 there was a limestone pivot socket.

Windows: No evidence preserved.

Others:

<u>Mastabas:</u> In house 081-083, a bench ran parallel to the north wall. In the north-east corner of 092 in house 092-093, there was a rectangular structure of internal

dimensions 181 x 99 cm. The walls were one brick thick, with hard brick of dimensions 34-35 x 8-10 cm. The bottom was built of hard mud.

Storage: In house 056-059, the remains of a large circular storage bin were found under the floor level. It had a diameter of around 5 bricks.

Buried pots: In house 032-033, north of the door and close to 033, the base of an amphora was found buried 15cm into the ground. In room 032, there was a small, circular mudbrick pit (inner diameter 28 cm, total diameter 65 cm).

A small pit was also found near the entrance of house 081-083, with remains of two vases in it.

MEMPHIS

External finishes

Roofs: No evidence preserved.

Walls: No evidence preserved.

Doors: Two fragments of an inscribed and decorated limestone lintel, bearing the name and titles of a lector-priest of Ptah, Sethnakht, were found in level II of room 9, lying next to the silo (Jeffreys 2006, 12); a limestone threshold with a pivot socket was found in room 8; both of them probably corresponded to the same door, most likely the entrance to a priestly property following a courtyard (room 9) (Jeffreys 2006, 23). To this, a possible portico could have been added (Jeffreys 2006, 15).

The entrance to 7/23 also had a limestone threshold with a pivot socket.

The level IIb entrance to house 2/17/14 was unusually wide and had no conventional doorway.

Windows: No evidence preserved.

Features: No evidence preserved.

Internal finishes

Ceilings: No evidence preserved.

Walls: The walls of rooms 3/21 in both levels were one brick thick.

Doors: In property 6/24, two limestone door jambs were found in their original place, although the wall where they would have been located was lost. They would have given access to the north section of room 6, where the mentioned alcove was located (Jeffreys 2006, 24).

Windows: No evidence preserved.

Others:

<u>Floor:</u> Rooms 7/23 and 8/9/22 had brick-paved yards or anterooms (level II).

<u>Ovens:</u> In the northerly of the central properties (5/19/20/26/27) level III, a brick-lined oven or fire jar was found at the rear of the yard.

<u>Storage:</u> Room 9 contained a brick storage silo (level II); rooms 15/16 and 2/17/14 both contained a circular storage bin in the southwest corner. The latter featured a silo built on a bed of limestone fragments.

In room 8 (level II) a circular mud container was also found. A square bench in the northwest corner of this room supported a ceramic object and its function could have been cultic or an animal coop (Jeffreys 2006, 15).

AMARNA

External finishes

Roofs: All roof evidence recorded came from N49.18/N49.58 (House of Ranefer). They were all found together in three deposits of rubble at the back of the house. One fragment (from the phase II house) of a likely beam casing with painted block pattern was also found (Kemp and Stevens 2010, 133).

Most of the evidence consisted of pieces of mud, of various consistencies and colours, and belonging to different parts of the rooms, such as the corner of roofs with walls.

Some pieces were of a pale, marly clay that included grit and pebbles, all smeared with a darker clay layer between 4.5 and 11cm thick. There were marks suggesting closely set round timbers and a coarse grass mat over them bound with cords spaced 2-2.5cm. Evidence of both loose grass and bundles of grass was found, as well as pieces containing some nodules of hard alluvial mud. All have the same impression of a coarse mat and a markedly convex surface from the slackness of the mat between the poles.

Other fragments were formed by a layer of alluvial mixed with fine plant material on top. On their underside, impressions of parallel cylindrical bundles of grass stems (c 3.5cm in diameter) were found, diagonally bound with string. The top side showed a thicker layer of darker alluvial mud forming a flat surface, up to 1 cm thick, which contained some sand but no plant material. This fragment also contained a single red-slipped sherd in the marl body clay which indicated that perhaps, it belonged to a wall instead (Kemp and Stevens 2010, 155).

Other fragments were similar, although the mud was slightly darker. The underside still showed undulating matting and a fine dark mud layer at the top the same but slightly darker, more alluvial. The length of one side was preserved, with a flat face and whitewash covering most of the surface, where it abutted a wall (max thickness 6.5cm).

Other fragments did not contain grit, but contained plant material, especially at the top. The underside showed marks of a mat against a narrow pole, as well as grass bundles pushed up against the edge. Others contained sand as well as grit and pebbles.

One of these fragments came from the edge of a roof and contained the impression of the original edge of the mat. Other fragments had impressions of loose grass bundles which were not laid parallel to each other, with logs laid over them. Their upper surface was flattish but rough and bore a thin coat of alluvial mud with little if any plant material. A variation of these showed impressions of loose grass stems lying parallel but not in bundles. Some fragments preserved a thick string edging cord.

Others showed the mark of a narrow oval pole, of c.3cm in diameter, as well as marks of some stems. Another fragment had impressions on both sides (on one, narrow irregular and closely set poles, 1cm diameter; on the other (and roughly at right angles) loose parallel grass stems, over a convex surface. One fragment had trickles of whitewash. The underside of another fragment showed impressions of tight narrow poles to one side and a mat to the other and did not have a layer of fine mud on top.

Another fragment showed impressions of poles but no matting or grass. The top side was flat but with broad shallow grooves, within a surface coating of mud mixed with plant material.

Walls: The walls of N 50.19 were half a brick thick, with brick dimensions being 30x16x8cm; only one to 3 courses were preserved. Some fragments had a main face, slightly concave, white with a thin black edge and on the upper edge there were traces of white; on the other face, yellow over an earlier white with blue. There were also two fragments of mud plaster, rich in straw, painted white, and slightly convex. There were all possibly fragments of a cavetto cornice.

Doors: The entrance to N 50.19 was located in the NW wall and was buttressed internally at either side.

The front door of Q 46.2., which looked out onto the High Priest street, had remains of a limestone threshold, over trace marks of where the poles used to be, a pivot and friction marks of the wooden door. Since the ground floor of this room was 42 cm higher than the second court, there were some steps, 7cm at 45cm slope and which had a narrow ramp surface at either side.

The remains of small notches on the outside of the front doorway of P47.6, as well as the lower brick wall supporting an absent threshold were preserved.

The limestone threshold of the front door of N51.4 was preserved, as well as the remains of an ashlar frame, which acted as external doorsteps on the outer wall. The doorway was buttressed on the inside at either side.

The limestone threshold of N49.58 (Ranefer phase I) was built with four narrow rectangular limestone slabs and two smaller infill pieces and had a circular pivot socket cut into it. The side slabs had raised edges. There were also smears of red paint in the position where presumably the jambs would have been (Kemp et al 2010, 75). The area of the wall which would have stood behind the jambs was covered with a thick mud plaster that preserved whitewash traces.

In N49.58 (Ranefer phase I) the entrance had some steps, with the bottom step made with headers, and some bricks belonging to the other steps having been preserved. These were also found in N49.18, with a full width of 2.17m and a smooth, narrow ramp on either side.

Windows: No evidence preserved.

Features: Outside house P47.6. a mastaba was found. In the corridor between the main house P47.6. and the surrounding wall on the northeastern side street were the only remaining fragments of a round oven. In the northwest corner of the Q 46.2. yard there is a series of ovens, in close proximity to the ovens from 46.1. The round furnace walls were made of baked clay and protected by a coat of mudbricks, with air inlet openings.

Internal finishes

Ceilings: A series of fragments of mud plaster from house N49.58 were found, but not in their original place. Most of them were painted white or pink-brown. Some of them could be from walls instead of ceilings. Others, showed indication of painted designs. Ten fragments, painted white, had remains of plaster which showed the marks of narrow wooden poles, tightly arranged.

Another fragment had a small patch of a separate mud layer bearing grass bundle impressions is also preserved. In another case the original white surface had been coated with 2-3mm of mud and painted white again.

Another source of information regarding the ceilings is beam fragments. Some of them showed traces of pink-brown and white repainting over a yellow ground. On two pieces of beam angle, one face was painted pink-brown, the other yellow. Another variant showed white repainted over discoloured white, or dirty pink-brown, on pieces of grass-bundle impressions. Another piece had a beam impression on the back, a cover of grey slurry and coated with a normal coat of white. A further area was carefully covered with a smooth layer of unpainted mud. Two others were similar except for the fact that the pure mud surface covered an intermediate layer of black over the white, and in turn had the edge of a black band painted over it. In another case the mud belonging to the plaster was also mixed with stones.

Another piece had a pale version of the pink-brown paint, covered with spots of white and impression of grass bundles at the back.

Other fragments were painted with a dirtier shade of pink-brown. Some others had rounded beam impressions on the back. Several others had a darker red band painted over. Another fragment was painted in the same way but its back was flat, impressed with wood grain that preserved patches of pink-brown paint. Part of this surface was covered by a further layer of mud plaster.

Walls: The walls of O 49.14 were preserved up to 4-5 courses, with brick dimensions being 32 x 16 x 9 cm.

The walls of room 14 in Q47.23c, those in Q47.23a and the second group of rooms of cluster 'b' were one brick thick; the first one had several pilasters which formed niches in between them. All the other room walls of Q47.23b were half a brick thick. Their brick dimensions were 33x17x9cm.

The brick dimensions in N49.6a. and N496.c were 33x16x8 cm, while in N49.6b and N49.6e. they were 35x17x9 cm.

The walls in cluster 'b' of O47.8 were only half a brick thick, although they were reinforced in wall corners and door openings with brick pillars. Room 14 in O47.8 had an alcove.

The south and west walls of the farmyard in Q46.2. were only half a brick thick and had pilasters at regular intervals on the inner side. The 'bedroom' in the SW corner of the house is marked by a particularly deep alcove. At the rear there were three low walls, which were preserved to a height of 78cm. Brick dimensions in this room were 33.5x16x8cm. The perimeter walls of the house and the first antechamber, the walls between the three-strip floor plan and the remaining walls of the two 'halls' were one and a half brick thick; all walls had survived to an average of 1.15m.

P47.6 The bedroom had a broad and deep alcove. The main walls of the house had a thickness of one and a half bricks. The brick dimensions were 32-34x16x19 cm.

N 51.4 The house was entirely built of one brick thick walls, which were preserved on average to up to 50 cm height and were plastered with mud. Plaster remains were found in the 'deep hall', in the northeast, southeast and southwest walls of the 'broad hall' and in the south wall of the hall, as well as remains of white plaster in the 'square room'. The brick dimensions of the square room were 31x15x9 cm. In the hallway and bedrooms, the walls did not show signs of having been plastered.

In the south chambers of N49.58 (A17 and A15) there were brick shelf supports along the rear southern wall. The same was found in A16 both in the south wall and running eastwards from the dividing wall with chamber 15, which also had a small patch of whitewash on mud plaster in its southwest corner. The western wall of A7 was not uniform in thickness and it stepped inwards at least 15 cm at one point. In A8, the wall thickened towards the west. A one-brick thick dais, framed with bricks on edge was found.

The brickwork of the north wall of the transverse hall in N49.18 is not totally uniform. At a distance of 50cm from the north-east corner, a vertical join ran completely through the brickwork. At a distance of 1.55m, there was a vertical niche, 65cm wide and probably one brick deep. A squared wooden beam, 80 cm in length and 17 cm in breadth was also found.

In the southern wall of Room 10, there was a vertical space, six-courses high, of mortar fill. Rooms 5 and 5a had false door niches, one in the north wall and one in the south-east corner. Another niche survived on the western wall of room 1, with a height of 1.20m, 80 cm wide and 15 cm deep. The surface of the main panel and of the sides was plastered with mud rich in straw. Remains of painted wall plaster, with different colours, hieroglyphs and depictions of people were also found. The eastern niche’s main panel was 83cm and 15cm deep. Two small patches of mud plaster painted red were found at the bottom left corners of the central recess and the left side panel.

Loose fragments of wall were pieces of mud plaster with painted designs, finished to different degrees of complexity and one from a painted scene, found in rooms 15 and 16. 13 fragments had pigment, mud, plant matter and a little sand, thin yellow paint, with hieroglyphs and a design in red and black. The reverse surfaces were generally irregular. Another five fragments had red and white paint on yellow background, some with paint on both sides. Seven fragments had blue paint over white; small fragment of straw-rich mud plaster with a yellow background and white, red and pink designs on top were also found. There were also remains of mud plaster with plant matter and a yellow background with streaky reddish brown on top, amongst other variations. Another group of fragments depicted a scene with hieroglyphs which included the head of a shaven male with a streaked cone.

There was also a block of alluvial mud mixed with grits and pebbles. The top surface retained a layer of mud mortar pats of the types used in brick laying (mud balls were used as mortar between bricks (Kemp pers. comm.). It also maintained a layer of straw-rich mud plaster. It also contained the impression of a wooden beam with an angle-chopped end.

Lastly, a beam was found with a diameter of 6.5cm which would have presumably been part of the wall.

Doors: In the north east wall of chamber 1 in Q 47.23b. there was a doorway fitted with limestone.

The majority of door openings in Q47.23 are reinforced by brick pilasters. In Q47.23c, there were several door openings framed with plastered plaques with rounded edges which were attached to the wall and to each other.

In both side walls and in the back wall of the 'deep hall' of Q 46.2., two doors are positioned side to side; only the threshold of the door that led to the staircase had been preserved. The door openings were partially covered with plain jambs that showed some notches.

From the threshold in the 'deep hall' (room 6) of P 47.6., a fraction of limestone plaster, the mark of a stone post and a lower pivot socket are preserved. Limestone was found at the connecting door between the deep and the broad halls.

N 51.4 The connecting door between the 'broad and ‘deep hall' also had a broad limestone threshold with traces of wooden door jambs and a pivot socket. In the square room there were also remains of a door.

In the ante-room (A10) of N49.58 (Ranefer I) a limestone threshold, made from several slabs, one of them larger, and containing a pivot block was found. Limestone thresholds or fragments of them were also found in the transverse hall (A1), side chamber A11, central hall, south chamber, southeast suite (room 4). In the case of the south chamber, these two slabs were coated with gypsum, there was a single pivot socket and a whiter patch of limestone in front, with indistinct patches of red marking. In room 4 there were two limestone thresholds, one of them with an obvious pivot socket. Slabs with pivot sockets were also found between A1 and A10, between A2 and A4, between A2 and A15 (two slabs, only one with pivot socket). Lastly, the end of a slab was found between A4 and A16 and the end of a threshold between A1 and A11. In A8 there was a brick threshold.

In N49.18 (Ranefer II) there was a damaged limestone threshold, with the bottom blocks of a pair of limestone door jambs in position. In the south wall of the transverse hall there was a wide, stone double doorway flanked by painted brick false doors. In side room 10, there was also a limestone threshold, a single narrow slab with single pivot socket. A blocked doorway was also found in the rear wall. Both side rooms 11 and 12 had limestone thresholds. The one on the north had two slabs with a pivot hole, the south one, three blocks with a pivot socket. South suite room 17 also contained half a stone threshold.

The door to staircase room 13 had a limestone threshold made of 3 slabs of different size. A separate slab contained a pivot-hole. Also a smaller, slightly raised rectangle (perhaps the bottom of a stone jamb) (Kemp and Stevens 2010, 91).

Rooms 5 and 5a contained a single limestone socket.

Windows: No evidence preserved.

Others:

<u>Floors:</u> The floor of Q 47.23b was made from a thick layer of Nile mud, as was the one in O 47.8.

Bedroom 14, the first hall, the deep hall, the square room, the corridor to the side entrance and the two outer rooms of Q 46.2 were paved with bricks. All the other rooms were floored with a thick layer of Nile mud. The floors of rooms 2 and 3 of the farmyard were plastered.

P 47.6. Before the door of the deep hall there were remains of brick paving.

In the entrance hall of N 49.58 (Ranefer I) there were remains of mud plaster over mud bricks. The plaster had traces of burning in the middle. There was a patch of damaged floor close to the threshold. In the ante-room, the floor was of a hard mud plaster, with traces of faint linear pattern. The transverse hall and the central hall, the south chamber (A17), room A4, A16 and A8 were floored with bricks coated with mud plaster. A7 had a mudbrick floor and no plaster preserved. In A14 there was an uninterrupted mud floor surface. In A5, both the floor and the silos in it had a mud plaster floor.

The entrance hall, transverse hall, central hall and the space under the stairs (room 13), rooms 15 and 16 of N49.18 had a brick floor. Rooms 5 and 5a also had a brick floor, of which is some parts the mud plaster was preserved.

The floor in the hallways and bedrooms of N51.4 was paved with bricks; the remaining floors were made of only a layer of mud, which was preserved only in places.

<u>Columns:</u> A limestone base and the mark of a round wooden shaft was found in the entrance hall in Q 46.2. In the 'large hall', one of the limestone bases was preserved in its place and the traces of another one were found, as well as in the deep hall (central column).

The mark of the limestone base of a central column was also found in the deep hall of N 51.4.

In the transverse room of N49.58 (Ranefer I) there were holes cut into the floor, one with a column base and the other without, with an edge of gypsum.

In the transverse hall of N49.18 there were two limestone column bases at the western and eastern end, supported by square brick piers set deeply into the ground (80 cm). In the central room, there were remains of two halves of a column, with marks of a concentric circular depression. In the entrance hall (room 9), a shallow inner recessed circle on the top surface. In the central hall there was a large limestone column base; it was made into two joined halves with a shallow recessed inner circle (115cm). In room 5 there were bricks laid in an arc, and top of a square support-pier of bricks. In room 15, there was a large limestone column base (70cm).

The column bases from phase II were not matching. The ones from the transverse hall had a recessed circular area made to stabilize the wooden columns the shafts of which had been painted red and had a base diameter of 38/39cm. One of the surviving pair had been overcut so that its plan was not exactly circular. The sole base in the central hall that survived until 1921 had been made in two halves and also possessed a shallow stabilising recess. A third and more minor variation of this was found in the rear central room.

Ovens: In cluster 2 of O49.14, courtyard 7 where there is an entrance, in front of the southeast wall, there was a small, round, brick oven in the west corner.

Room 13 (side room) in Q 47.23.also contained the remains of a coated oven. In the east corner of a narrow courtyard in N49.6b a covered oven was also found.

Staircases: Remains of staircases were found in Q 47. 23d and b (remains of the first step), room 6 of N49.6 a., room 13 of N46.b and room 30 of N49.6 e. (where steps were built with brick on edge). Also built with brick on edge was the staircase of the corner of the deep hall of O47.8 – which had a gradient of 25-30cm in its lower section.

In the first antechamber (22) and the middle ground strip of Q 46.2. there was also a staircase. The lowest levels of the staircase were filled with mud plastering on which there was the imprint of three tightly placed logs.

The steps of staircases 11 and 13 in the deep hall of P 47.6. were made of bricks on edge.

The deep hall of N51.4. had a staircase, also constructed with bricks on edge. The space under the staircase was accessible from a narrow opening underneath.

The two lowest steps of the staircase room 13 were preserved and were made of bricks on edge, except for the bottom step where the bricks were laid flat.

Mastabas: On the Northwest wall of the main living room of cluster 1 of O 49.14, a brick bench had been preserved, as well as in the corner of room S-6 of Q 47.23b, Q47.23d in the main living room, made of limestone, the main living room of N49.6b (in front of the southeast wall) and N49.6.f (main living room, northwest wall), the deep hall of O47.8 (southwest wall), Q46.2 (in front of the back wall of the deep hall and in the square room), N 51.4. (between the two doors leading to side rooms in the southwest of the deep hall), and the central hall of N49.58 (rear wall, measuring 2.5 x 0.9m and possible second mastaba on the eastern wall).

Storage: In room 2 of O49.14, there was a small cellar built with bricks walls, filled with processed fragments of alabaster and slate.

In courtyard A5 of N49.58, two circular granaries of external diameters of 2.45m were found.

In room 10 of N49.6b. there was a flat, rectangular pit, which was lined with bricks.

Buried pots: In room 2 of O 49.14 a large, half-buried pitcher was found. The broad hall and the large hall of O47.8. also contained some buried pots. In O 49.14, a few small pits were also found in the ground. These vessel marks were also found in the deep hall of P47.6, and in front of the southwest wall, one of those vessels has survived, half-buried into the ground. Another pot mark, with residues of ash, was found in anteroom of the bedroom.

In the living room of Q47.23 d. there was traces of a possible fire bowl.

In rooms 16-18 of Q 47.23., two buried pots protected around the edges were also found, as well as two sets of circular impressions in room 5 of N49.18.

Troughs: In the main living room of Q47.23c, N49.6c (perhaps a fire pit), O47.8.b. (yard), room 17 of O47.8a. and P 47.6.there were troughs. The latter had fragments of what possibly were fired clay loom weights. In the transverse room and the central room of N49.58 (Ranefer I), there was a hole in the floor which could be a trough (Kemp and Stevens 2010, 76, 79).

In Rooms 5 and 5a of N49.18/58 there were two small mud pedestals.

KARNAK

External finishes

Roofs: No evidence preserved.

Walls: No evidence preserved.

Doors: House I had a sandstone doorway, 75cm wide and 110cm deep, a limestone threshold, and jambs with inscribed hieroglyph text in three vertical columns. The lintel was made of a 18cm thick slab and was attached to the wall by two dovetails. There was also a ring cut into the stone which would have also served to secure the lintel (Anus and Saad 1971, 220).

House II had jambs without any inscriptions, but the right side of lintel had a representation of a human figure, presumably the owner (Anus and Saad 1971, 228). The door opening was 65cm wide and 80 thick, frame and jambs were made of slim slabs, fixed with plaster; the way of fixing the lintel was identical to that of house I.

House III: only the threshold was preserved.

Windows: No evidence preserved.

Features: No evidence preserved.

Internal finishes

Ceilings: No evidence preserved.

Walls: The walls of rooms C and D of house I were rendered with white plaster.

In the northeast corner of room D in house I, there were recesses on the wall of approximately 6cm diameter, aligned, 1 m from the ground.

The thickness of the wall of room J was not homogeneous; it was very thick at the top and separated from its lower part by a thick layer of debris.

Doors: The courtyard doorway in house I was entirely made of stone 65cm wide, 75cm deep and 162 high.

The door in hall b giving to two other rooms, was framed with slim pieces of sandstone, 15 x 19 cm, fixed to the wall with mud mortar.

In room J, there was a stone paved doorway.

The door that gave access to room E had been walled.

The yard in house II had a door with a moulded stone frame, made of two sides and a thin moulding.

Windows: No evidence preserved.

Others:

<u>Floor:</u> The kitchen/storage area in house III was paved with irregular stones.

<u>Columns:</u> In the courtyard of house I, a column stood to the left.

In the south part of the yard in house II, there were 2 sandstone columns.

<u>Ovens:</u> Ovens were found in courtyard E of house III and in the kitchen of house.

<u>Staircase:</u> In the right hand side of the courtyard of house I, the first steps of a staircase were found.

In corridor E of house II, a stone step, and marks on the wall where the steps would have been fitted were also found.

In the south section of house VI, some stone steps belonging to a staircase were found.

<u>Storage:</u> In the courtyard of house I there was a staircase, whose body could be accessed from inside the house and was used for storage.

<u>Buried pots:</u> House III: kitchen/storage area: a vessel support and a large jar were found buried into the ground.

EL- ASHMUNEIN

External finishes

Roofs: No evidence preserved.

Walls: j.10 level 1b and j.12 had deeply founded outer walls, which were set into trenches. The total preserved height preserved of wall 1003 was 110cm and its thickness 80cm. The bricks through the foundations were in size range 30-1x14-15x9-10cm, laid in alternative headers and stretchers on the faces of the walls while the interior was made mainly of headers. The thickness of certain courses had been adjusted by including wide vertical joints filled with sand. Occasionally bricks on their edges had been used to adjust the level of courses, and bricks on edge were regularly used in the base courses of the foundation.

k.10 level 2b: wall 1089 was 65cm thick and preserved to a maximum height of 45cm. It extended for a distance of 7.70m. All external walls were built of dark grey mud bricks measuring 30x15x8-9cm laid in irregular headers and stretchers bond. Thickness of wall 10801 was 78 cm and, at a latter phase, 90cm.

k.10-j.10 level 3: wall 1045 was preserved up to 1.30m above foundation. It consisted of mudbricks measuring 31-33x13-14x6.5-7.5cm. Bricks in wall 1046, which was 42cm thick, had dimensions 37x18x9cm. Wall 1048 was 40cm thick, and its brick dimensions 37.5x19x9cm, laid in headers and stretchers bond. On its south face was a coat of added brickwork, 42cm in thickness, part of another structure attached to it.

k.11 level 1c: the thickness of wall 1136 was 75cm; after it crossed wall 1139 it increased in thickness to 85cm.

k.11-j.11 level 3: Wall 1132 had mixed bricks: some sandy examples of dimensions 35-6x17-18x9-10cm and some grey bricks measuring 30-31x15x9cm. Bricks on edge were also used as part of the bonding.

Doors: k.10-j.10 level 3: the doorway of room 3i was 103cm wide, with a piece of limestone located at its south side in the usual location of a pivot, but without a socket.

j.11-k.11 level 3: the width of the doorway was 82cm, with a limestone pivot-block to the west side. There is an open space to the side so it is not clear whether this is an external door.

Windows: No evidence preserved.

Features:

<u>Storage:</u> Outside the eastern side of 3i, two mud storage bins were found; part of a kiln, whose debris rested against the exterior east wall of the house, was also found, as well as a wall built against it and a clay oven, probably of a later date than the kiln. The collapsed floor of the kiln consisted of fired clay elements of semicircular shape, perforated. Many sherds and pottery were found in the surroundings.

Internal finishes

Ceilings: No evidence preserved.

Walls: j.10 level 1b: the north and west walls of chamber 1, ix, were founded at less depth than the surrounding walls.

k.10 level 1b: walls 1028 and 1029 were preserved to three-four courses, with bricks measuring 31x15x9.5cm.

j.10 level 2a: wall 1051 survived to a height of five courses and was 32cm thick.

j.10 level 2b: wall 1061 was 55cm thick. Walls 1016 and 1080 were 32cm and 40cm in thickness. Wall 1016 was preserved to a height of six courses of bricks, laid in a rather irregular fashion. Wall 1080 was preserved to a length of 3 m. Wall 1052 ran 2.10m, was 60cm thick and inter-bound with 1080.

k.10 level 2b: built of dark grey mud bricks measuring 30x15x8-9cm, laid in irregular class A bonding, with some parts bonded as A2.

k.10-j.10 level 3: wall 1084 was 60cm thick, with bricks 33-34x16x7.5cm; wall 1097, 95cm. bricks from wall 1097 had dimensions 33-4x16x7.5cm. Wall 1076 in rooms 3vii-viii was 30cm thick and built of pale yellow sandy bricks (31-2 x 14 x 2.5cm).

j.11 level 1c: walls 1120 and 1121 and block of brickwork 1119, were made of dark grey mud bricks, of single brick thickness, built in alternate courses of headers and stretchers. A block of solid mass 265x105cm of which eight brick courses were preserved, was also found, as well as a mass of bricks on the west side, of maximum height 75cm and which consisted of irregularly-bonded bricks. Wall 1123 was 65cm thick.

k.11 level 1c: the thickness of wall 1142 was 75cm.

k.11-j.11 level 1c: wall 1139 the bricks of the upper level (1c) were in the size range 30-1x15-16x8-9cm (5 courses), the level 3 bricks below (eight courses) were slightly different, up to a max of 32.5cm for the length. Wall 1128 increased in width from 75 to 90cm: the level 3 courses were of dimensions 35-6x17.5-18x10cm but the added level 1c (6 courses) bricks were similar to the upper part of wall 1139 (30-1x15-16x8-9cm). After crossing 1139, the thickness of the wall was reduced to 50cm.

k.11-j.11 level 1c:on the west side of the room a curved wall of mud brick consisting of only a single course of headers, extended from the east face of wall 1139 and ended in the middle of the room.

k.11-j.11 level 3: low walls: 1188 and 1189 across the room between walls 1132 and 1123. The first one had a single course of headers, bricks measuring 36x18x10cm; the other, wall 1189, was formed of sandy bricks 34x16.5x9cm in size, laid as three rows of stretchers. Between walls 1123 and 1142, there was a low thin wall, 40cm thick and a single course in depth. The lower courses of wall 1194 were made of bricks on their edges, slightly titled. Otherwise the wall had a bond of stretchers and headers with a core composed mostly of headers. In wall 1142 there was the same bonding, but more regular and in an A2 arrangement, with the wall thickness equal to two and a half brick lengths. The bricks were 35x16.5x8.5cm. Embedded in the brickwork of that wall there was a fragment of black pilgrim flask.

Wall 1191 was preserved to a height of three courses, across the space between walls 1142 and 1139.

Doors: j.10 level 1b: limestone pivots sockets were found, pierced on both sides. A third pivot socket was found underneath them. Pivot 1007 was an irregularly shaped piece of limestone (22x18x8.9cm), with a pivot recess which was approx. 5cm across and 1.5cm deep in its centre. The recess on the other side was 6cm diameter and 2cm deep. Pivot 1008 was roughly circular, max diameter 24.5cm and thickness 7cm. Its main recess was situated off-centre, measuring 7cm across and 2.5cm deep. A smaller depression was cut into it, of dimensions 3.5cm diameter and 0.5cm depth. The reverse side had three major pivot points and two smaller ones. The three large ones measured 3, 3.5 and 5cm with depths of 1.7, 3, and 2.5cm respectively. The pivot found buried underneath them (1008a) was an irregular piece with a max length of 20cm, 12cm width and 10cm thick. There was only a pivot on one side; this was located in the centre, with 8.5cm diameter and 2.5cm depth.

k.10 level 1b: a limestone pivot was found without a trace of where the doorway it belonged to ended. It measured 51x25.5cm.

j.10 level 2b: a limestone pivot block was found.

k.10-j.10 level 3: Between 3i and 3iv there was a 50cm-wide doorway, which had a limestone pivot block to the north jamb. The doorway from 3iv to 3v, had a fragment of worked stone without a recess, situated inside the door beside the southern jamb. The doorway from 3vi to 3iii had an in-situ limestone pivot socket, a roughly triangular piece of limestone 24x28x26cm with a pole depression of 4.5cm in diameter. The doorway of 3viii was 45cm wide.

j.11 level 1c: A door in wall 1123 had been bricked up.

k.11 level 1c: a limestone pivot block was found south of wall 1136. Two other pivots on the west section of wall 1139 were probably not in situ. They had multiple pivot-holes pierced into them. Pivot block 1138 measured 25.6x19x10.2cm and had a recess on both sides. The depression on one side was 4cm across and 1.5 cm deep; on the other side, it was 10 cm diameter x 2cm deep. The pivot block 1141 was 22x18.5x18 cm, with two depressions: one measuring 5 cm in diameter and 8.5cm in depth; another one, being 7.4cm wide and 2cm deep.

Windows: No evidence preserved.

Others:

Floors: j.10 level 1b: traces of mudbrick paving were found, particularly in chamber 1, v, which were formed of bricks measuring 30x15x9 cm, laid flat in two courses.

k.10 level 1b: two small patches of white plaster flooring to the west of wall 1029 and of mud brick flooring to its east were recorded.

j.10 level 2b: a small area of brick pavement was built mainly with mudbricks on their edges, although few plain headers and broken bricks to fill up irregular spaces completed the construction.

k.10 level 2b: there were traces of a sandy brick pavement extending to the east for some 2.5m.

k.10-j.10 level 3: parts of the stamped mud floor had survived.

Ovens: k.10 level 1b: two ovens were located, 1026 and 1025, the first one of which measured 113 cm x 42cm; the other, 71cm. both built over remains of previous ovens. Brick features of undetermined use were also found, such as single bricks, resting on an accumulated fill some 25cm above a plaster floor, which could be part of low screen walls protecting the two ovens.

A kiln had been partially preserved on the northeast corner. It was 52cm high, 13cm deep and 34cm wide. The side was one brick-length across and the mudbricks were reddened.

j.10 level 2a: two clay ovens (additions to level 2b) were found, with diameters 90 and 60cm respectively.

j.10 level 2b: in the west corner, remains of a clay oven, 105cm in diameter, were recorded.

k.10 level 2b: an oven with a maximum diameter of 150cm was found.

Another finding was a square hearth, with a deposit of carbon inside, with a red pottery tray lining the interior. Its dimensions were 90x100cm and it was only preserved to a height of just over a single course of bricks.

j.10-k.10 level 3: in the easternmost area, a kiln was located which was associated with further brickwork and burnt debris. In room 3, ii, there was a circular brick-lined hearth, which still contained evidence of burning. On the east side there was a circular clay oven, 70 cm diameter with carbon fill around. The interior of small hearth formed by bricking up a corner was lined with a pottery tray.

j.11 level 1c:. There was an oven, 98cm diameter, built over the remains of an earlier one. Two circular brick hearths, one of which was enclosed by a single course of mud bricks had been built over the remains of a large silo. Another oven of 115cm diameter had its eastern half destroyed.

j.11-k.11 level 1c: oven 1192 and 1145 were found, the latter having replaced the former. The latter was surrounded by two courses of mud brick built out from the south face of wall 1136. These two courses were a course of stretchers above a layer of tilted headers on their edges, with brick dimensions 33x16.5x8.5cm. The oven had a diameter of 90cm and stood to a height of 36cm.

Both 1145 and 1146 had several pottery trays. 1146 was also on top of a former oven, and was 120cm diameter; the previous one was 90cm and preserved to a height of 22cm. It was level with a rough limestone in front of it. 1147 was another oven which had lost its southern part but had an original diameter of c.140cm. Surrounding the aperture in the front of the oven there were three mud bricks, a feature also noted at the others. In the case of oven 1146, the two bricks placed around the aperture in the front had been wedged in place with pieces of broken pottery.

k.11 in the northeast corner of the room east of wall 1139, oven 1192 was found, with a diameter of 110cm in diameter and destroyed in its eastern part.

<u>Staircases:</u> k.10 level 3: the upper surface of a brick stairway (1090) was found, which was built with bricks on edge forming steps. The fired bricks found beside wall 1044 were 34 x 16x 7.5cm.

<u>Storage:</u> k.10 level 1b: A brick bin was built against wall 1020. A block of brickwork with several pottery vessels was found; one of these vessels contained carbonized wheat. The block consisted of two parallel side walls, each 30cm thick, separated by a space 60cm wide and 140 cm long. The space was open to the south but closed to the south by means of sandy bricks which extended 87cm north from

the end of the internal compartment. The bricks of this structure were 30x15-16x9.5 cm; plates and a limestone weight were also found with it.

A separate small piece of brickwork, filled with mixed sherds was also found.

k.10 level 2b: A square brick structure, 135x140cm in size and a single course deep was recorded. A third brick feature of similar type was found against the south face of wall 1044, at its eastern end. It was 110cm wide and projected 75cm from the wall.

j.11 level 1c: The curved outer wall of a silo, a single brick thick, was found in the northwest corner of j.11 against the south side of wall 1116. A small brick bin was built above its ruins, against the south side of wall 1116. It was 87x 80cm deep and made of two courses of bricks. Another brick bin, a single course thick, was uncovered on the north side of wall 1128, with an ash fill underneath.

Buried pots: j.10 level 2b: close to the edge of the square and 2.5m east of wall 1062 the base of a red pottery water jar was found set into the ground.

k.10 level 2b: in the corner between walls 1067 and 1089 was the lower part of a large red ware pottery vase, set into a pit filled with soft dust. Under it, fragments of a similar one, and part of a pink marl with handles were also found.

Pits: A series of pits were found dug in the ground in different areas, which contained fire dogs, bowls, querns and pottery, disposed of throughout time, in k.10-j.10 level 3 (which included remains of ash), k.10 level 1b and j.10 level 1b.

Fig. 1.1. Map showing main ancient Egyptian archaeological sites (http://www.bible-history.com/geography/maps/map_pharaonic_egypt.html)



Fig. 1.2.
Top left: clay model, 12th Dynasty, Hierakonpolis (Metropolitan Museum of Art, New York)
Top right: clay model, mid 13th Dynasty, el-Rifeh, Tomb 72 (Metropolitan Museum of Art, New York)
Bottom: wooden model, tomb of Meketre (TT 280, Thebes) (Metropolitan Museum of Art, New York)

1.Unspecified
2.Unspecified
3.Bedroom
4.Dressing room
5.Side room
6.Entrance hall
7.Unspecified
8.Night rooms
9.Unspecified
10.Square room
11.Side room
12.Side room
13.Deep hall
14.Side room
15.Unspecified
16.Staircase
17.Small room
18.Small room
19.Unspecified
20. Deep hall
21.Second hall
22.First antechamber
+ entrance steps

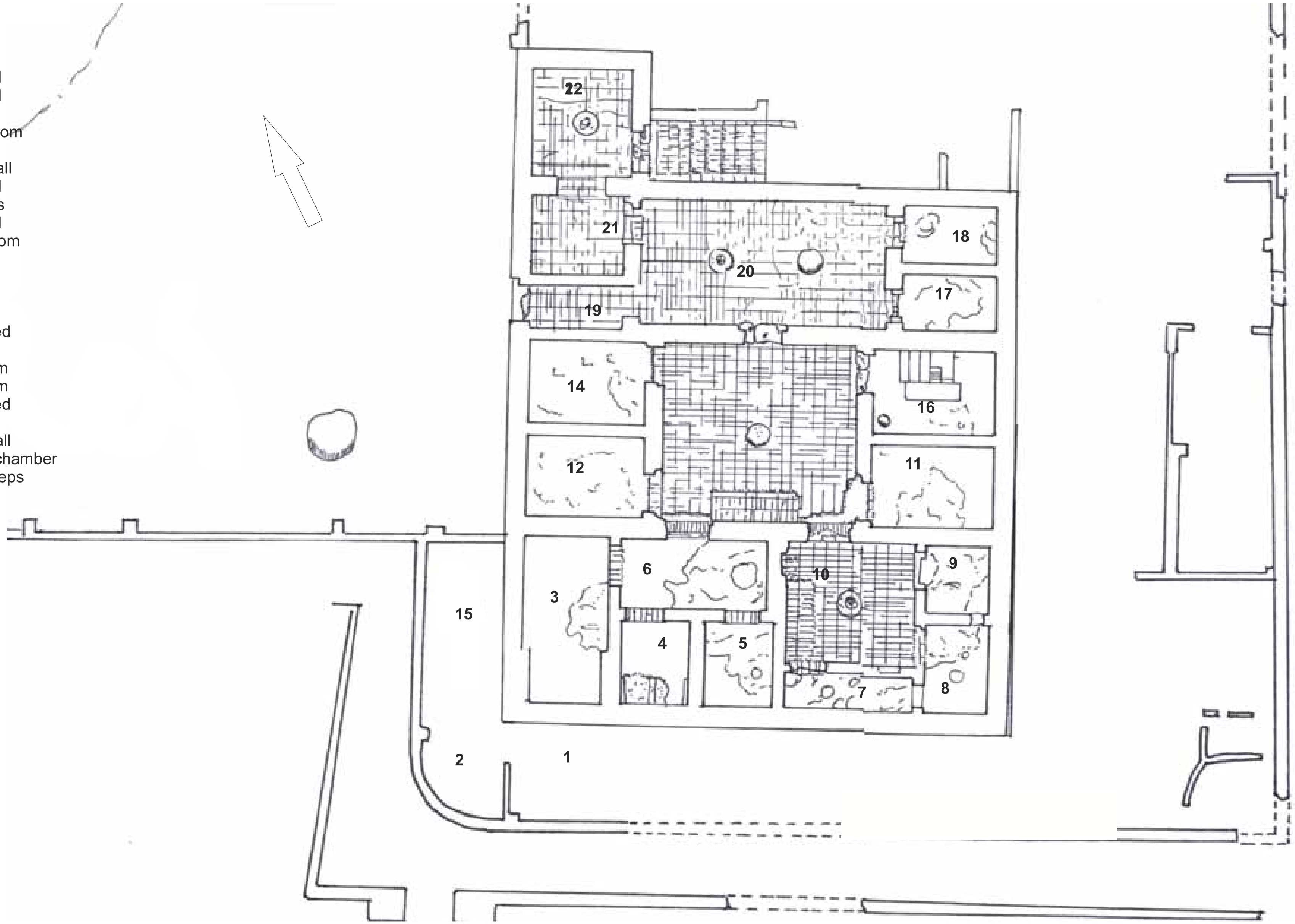


Fig. 2.1. House Q46.2. in Amarna (after Borchardt and Ricke 1980, plan 3) (not to scale)

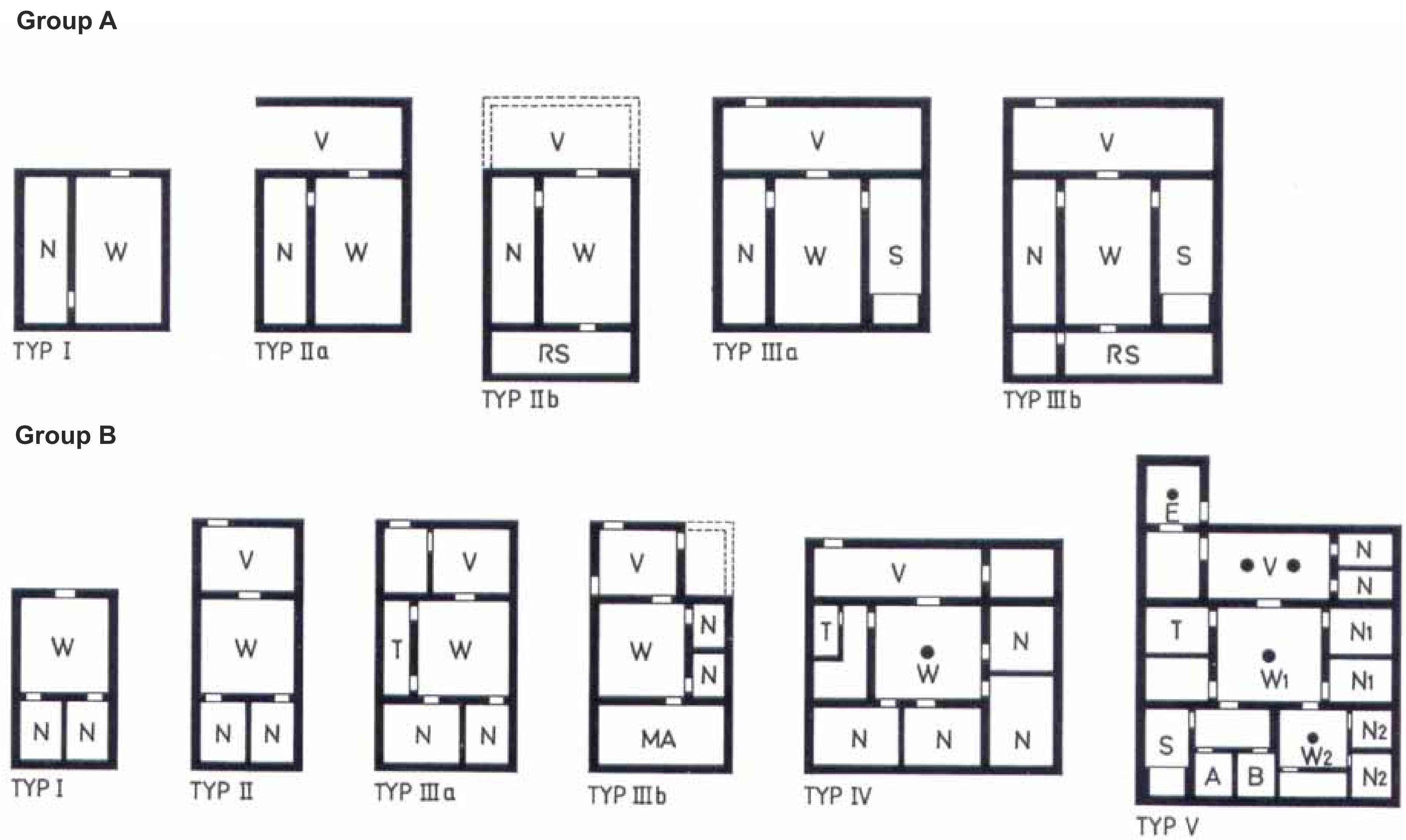


Fig. 2.2 Group A (Tell el-Daba) and Group B (Amarna) house types (Bietak 1996, 24)
N: adjoining room; V: vestibule; W: living room; T: Staircase; S: bedroom; A: dressing room; B: bathroom; MA: Magazine

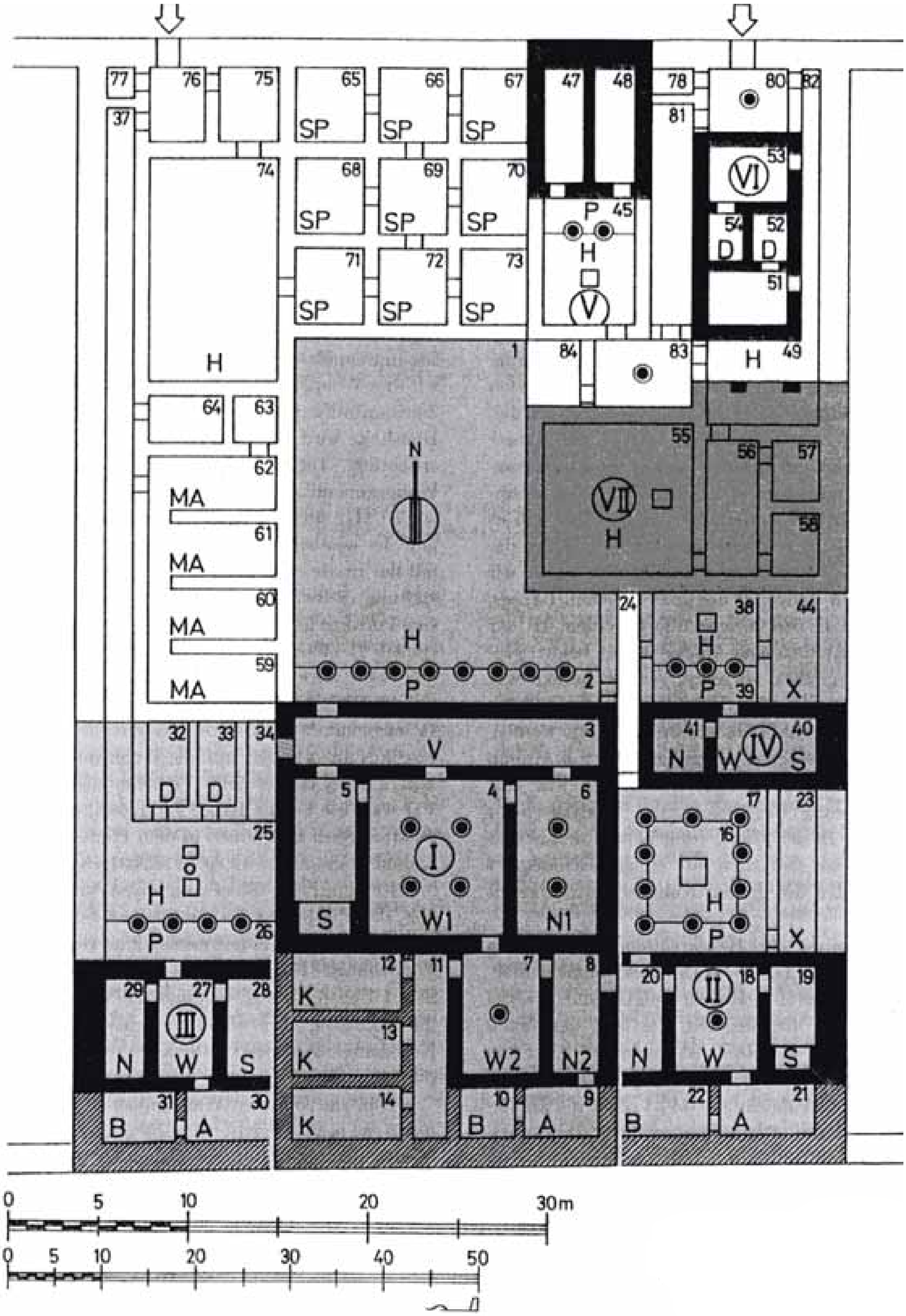


Fig. 2.3. Ground plan of Kahun mansion 2 with smaller residential units identified by Bietak (1996, 32)

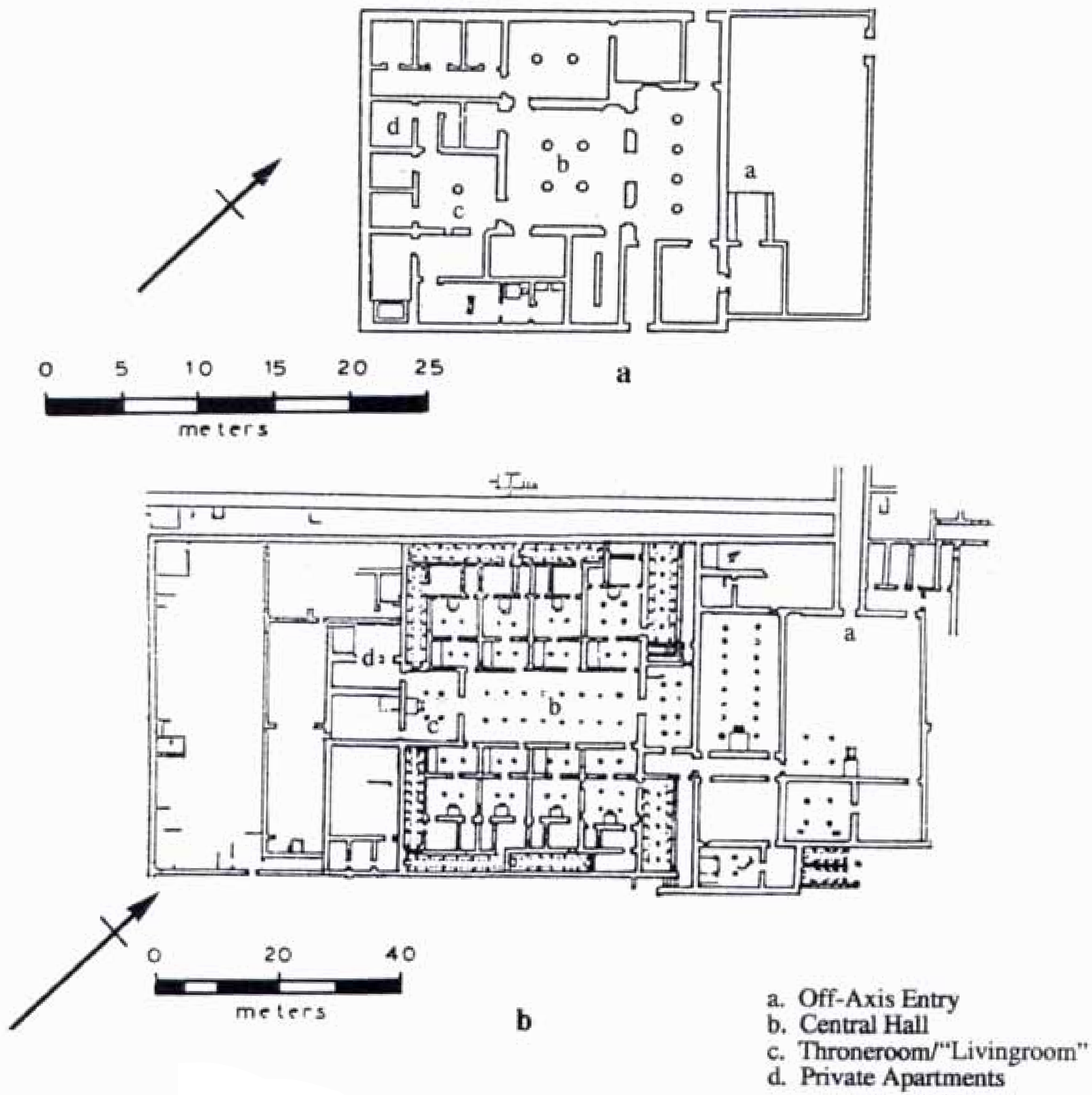


Fig. 2.4. Comparison between standard Amarna villa and Palace of Amenhotep III at Malkata (Lacovara 1997, 161)

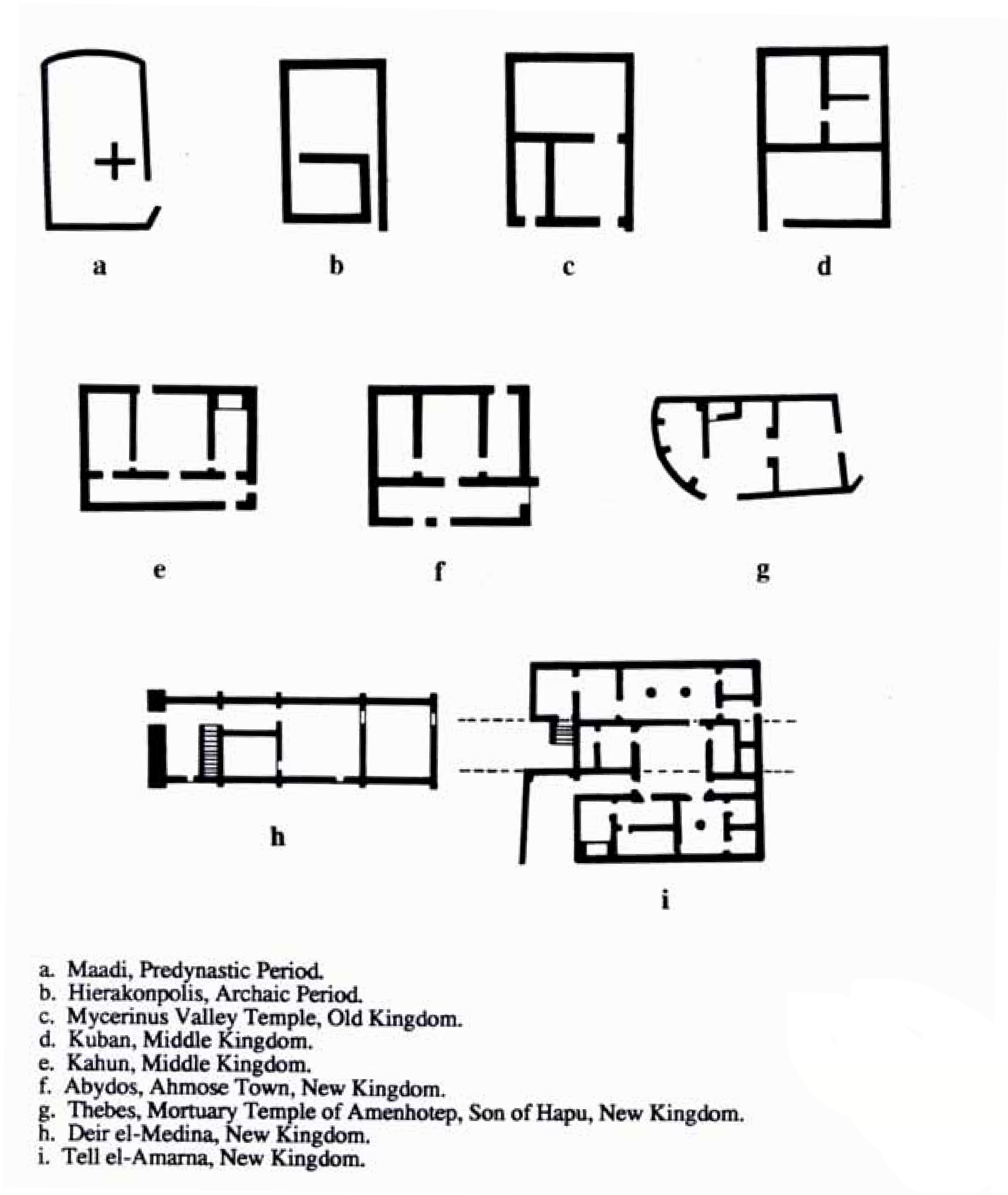


Fig. 2.5. Evolution of the ‘divided court’ (Lacovara 1997, 163)

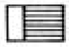
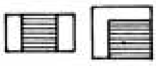
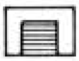
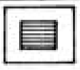
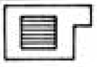
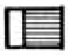
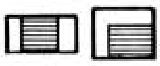
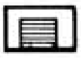
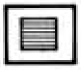
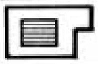
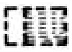
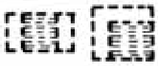
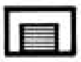
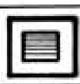
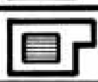
Type	Wall thickness (cm)	Floor plan examples	Number of residences no.	Number of residences (%)
1a	½ brick (13,5 - 18)		27	5,08
1b			70	13,16
1c			105	19,74
1d			60	11,28
1e			2	0,38
2a	1 brick (30 - 38)		2	0,38
2b			13	2,44
2c			33	6,20
2d			89	16,73
2e			47	8,83
3a	1 ½ brick or more (50 - 118)		0	0,00
3b			0	0,00
3c			1	0,19
3d			8	1,50
3e			36	6,77
Rest			39	7,33
Total			532	100.00

Fig. 2.6. House classification based on size, function, equipment, building material quality and temperature performance (Tietze 1985, 84)

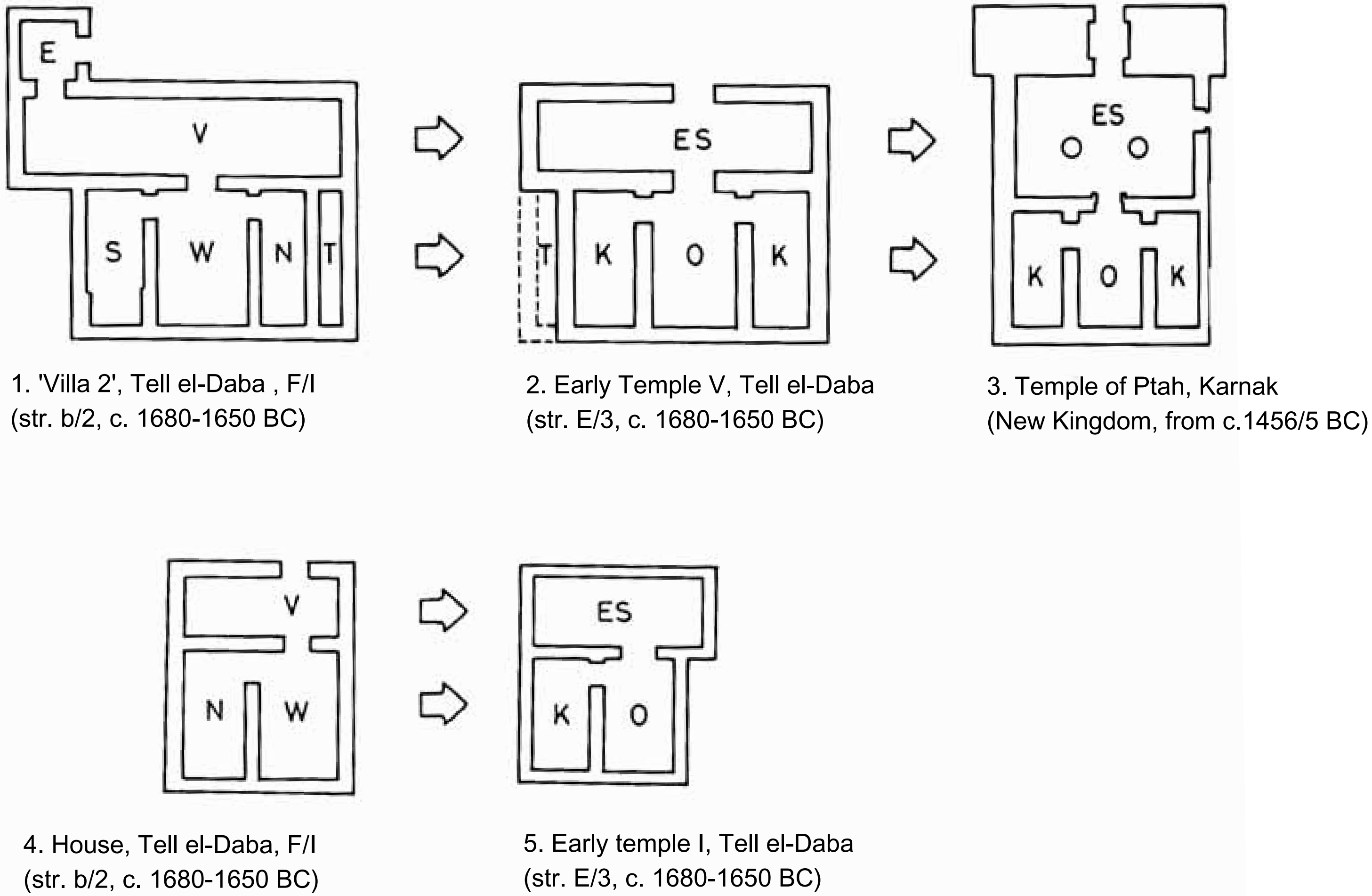


Fig. 2.7. Parallelisms between Middle Kingdom house and temple plans at Tell el-Daba, and evolution of types 1-2 into temple with side sanctuary plan (3) (Bietak 1994, 43) (Tell el-Daba strata dates are from Hein and Jánosi 2004, 25; New Kingdom date is based on Piccione 2003, 91 and Shaw 2000).
N: adjoining room; V: vestibule; W: living room; T: Staircase; S: bedroom; ES: hall of appearance; K: sanctuary/image cult room; O: Sacrificial table room

NAME OF VILLAGE	LOCATION
Kom el-Abiad, Kom el Naggar, Najrij, Sa el-Hagar, Hissat Abbar, Kom Surad, Surad, Birma	Gharbeya (10)
Shabas el-Shuhada and Shabas Ummayir	Kafr el Sheikh (13)
General descriptions	Menoufiya (16), Dakahliya (7), Sharquiya (23), Beheira (4) and Qalyubiya (20)
Qurna, Qurnet Marei	Luxor (27)
Naqada, Hu, Shenhur, Dendera, Qift, Mari Girgis	Qena (21)
Balat, al-Qasr	Dakhleh Oasis (17)

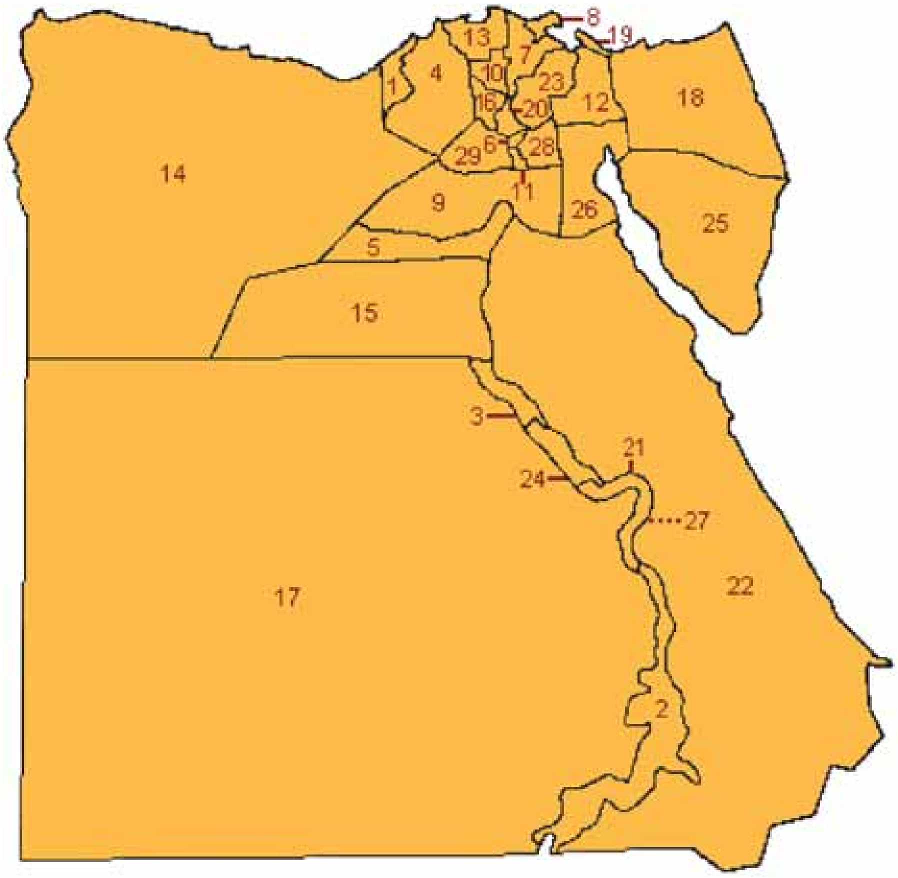


Fig. 2.8.
Top: Modern locations included in the data collection (with corresponding governorate number)
Bottom: map of Egyptian governorates (www.wikitravel.org)

Site	Period	Area	Phase/level	Dynasty	Houses
Giza	Old Kingdom	Kenthkawes Town (KKT)		4th	Houses A-K
Kahun	Middle Kingdom	Western town – workmen's houses		12th-13th	All (general descriptions)
		N wall: 5 large properties			All (general descriptions)
Elephantine	Middle Kingdom	South city of Chnum temple	XVb	Late 11th	H25b
		South city of Chnum temple	XVa	Early 12th	H25a
		North City	XIV	12th	H86
		South city of Chnum temple	XIII	12th	H10, H12
Lisht	Middle Kingdom/Second Intermediate Period	North - Cemetery	IIa	13th	A.13, A.33
Tell el-Daba	Middle Kingdom	F/I	stratum e	Early 12th Late 13th	I/20: 5, 6, 7, 8
Tell el Daba	Second Intermediate Period	A/V	stratum E/1, D/3, D/2	15th	032-33,056-59,056-60,081-083,092-093,173-176
Deir el Ballas	Late Second Intermediate Period	Houses by North Palace		Late SIP	House E
Memphis	New Kingdom	Kom Rabia:RAT	level IV level III level II	Early NK 18th 19th	rooms 7/23, 8/9/22, 3/21, 2/7/14, 19/20/5/26/27, 24/6
Amarna	New Kingdom	Main city		18th	Q47.23, N50.19, O49.14, N49.6, O47.8, N51.4, P47.6, Q46.2, Ranefer I and II
El-Ashmunein	Third Intermediate Period	Site W	level 1b,2a,2b,3	22th-25th	j.10 and k.10
		Site W	levels 1c, 3	22nd, 24th, 25th	j.11 and k.11
Karnak	Third Intermediate Period	East of Amon's temple sacred lake	phase 1	21st	Houses I to VI

Fig. 2.9. Table showing all ancient locations included in the data collection

Fig. 2.10. Map showing all ancient locations included in the data collection (Google Earth © 2012 Cnes / SpotImage, Image U.S. Geological Survey)

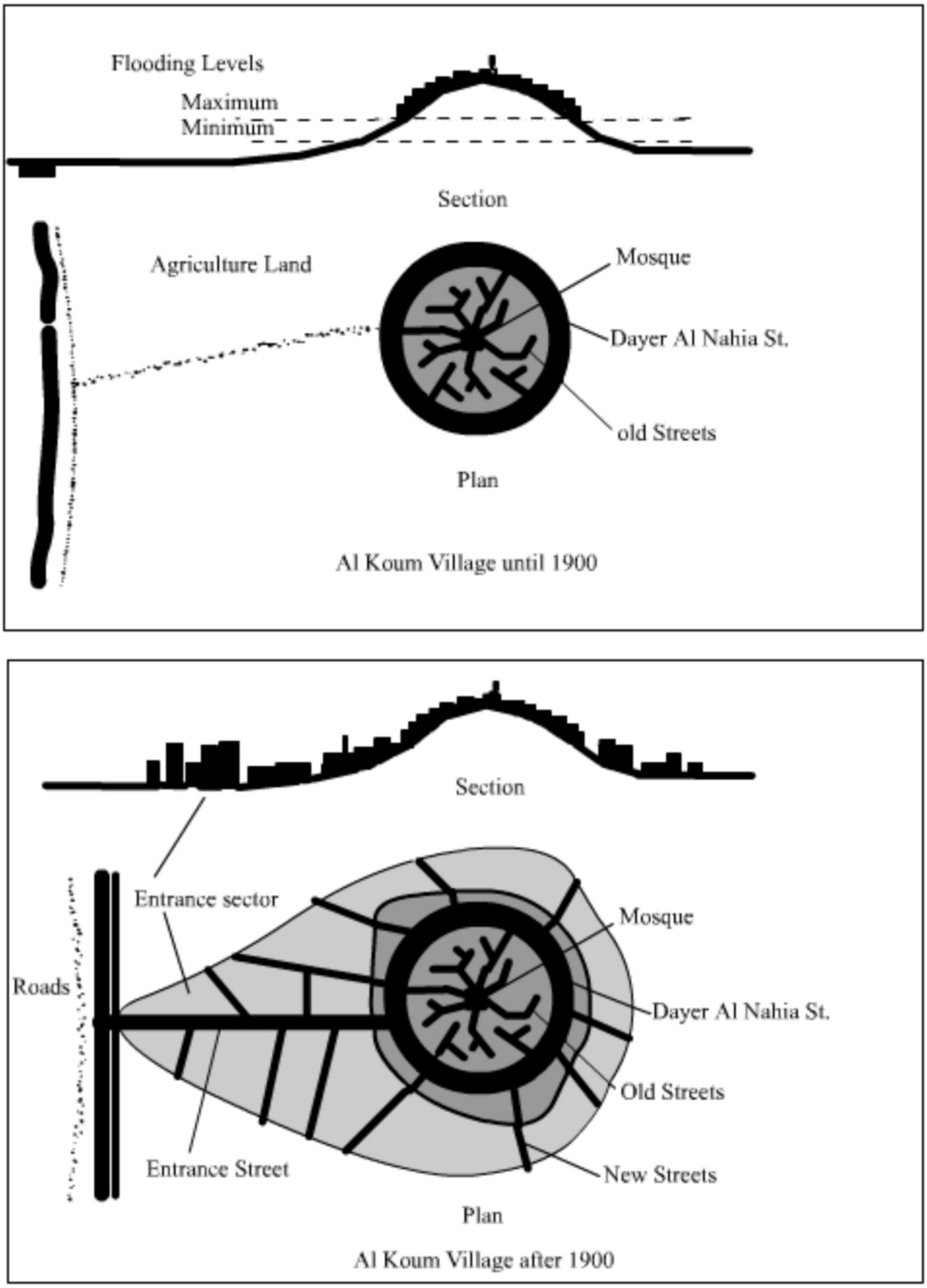


Fig. 3.1. Al koum village before and after 1900 (Mahgoub 2000, Figs. 2 and 4)

- EXTERNAL FINISHES
  - ROOFS
    - •Materials
    - •Types
  - WALLS
    - •Materials
    - •Types
  - DOORS
    - •Materials
    - •Types
  - WINDOWS
    - •Materials
    - •Types
  - FEATURES
- INTERNAL FINISHES
  - CEILINGS
    - •Materials
    - •Types
  - WALLS
    - •Materials
    - •Types
  - DOORS
    - •Materials
    - •Types
  - WINDOWS
    - •Materials
    - •Types
  - OTHERS

Fig. 3.2.Classificatory scheme of modern features

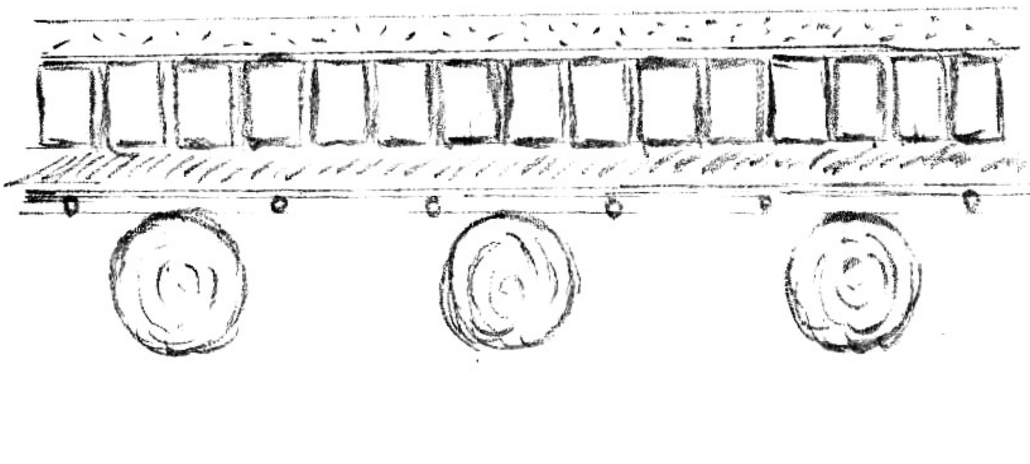


Fig. 3.3.
Top: Basic roofing structure (Kom el Naggar, photograph by the author)
Bottom: Sturdy roof layers (sketch by the author)

Fig. 3.4.
Top: Sturdy beams and matted reeds roof (Najrij, photograph by the author)
Middle: Sturdy roof with perpendicular reeds (Najrij, photograph by the author)
Bottom: Use of plastic sheeting above matted reeds (Surad, photograph by the author)

Fig 3.5.
Top left: Piled hay over beams forming canopy (Kom Surad, photograph by the author)
Top right: Roof with cotton branches (Kom el Naggar, photograph by the author)
Bottom left: Roof covered with plastic sheeting (Buto, photograph by the author)
Bottom right: Mud patties stored on roof (Hissat Abbar, photograph by the author)

Fig 3.6.
Top left: Common bond (Sa el-Hagar, photograph by the author)
Top right: Stretchers, headers and brick on edge (Najrij, photograph by the author)
Bottom left: Stretchers and brick on edge (Birma, photograph by the author)
Bottom right: Irregular bond (Buto, photograph by the author)


a.


b.


c.

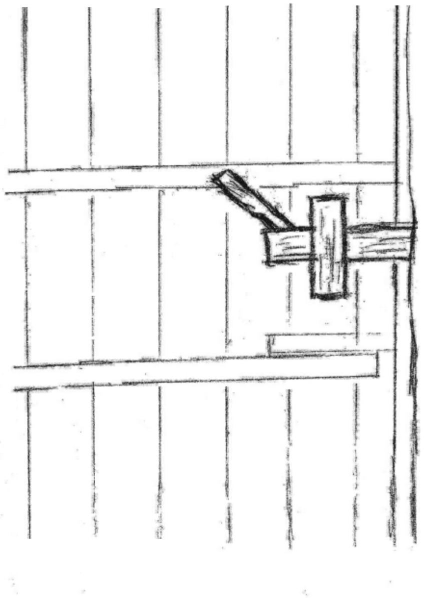

d.


e.

Fig. 3.7.
a. Render showing animal wool inclusion (Sa el-Hagar, photograph by the author)
b. Render showing glazed pottery inclusion (Sa el-Hagar, photograph by the author)
c. Render showing shell inclusion (Sa el-Hagar, photograph by the author)
d. Painted render (Birma, photograph by the author)
e. Cement render (Sa el-Hagar, photograph by the author)

Fig. 3.8.
Top left: Curved wall profile (Shabbas Ummayir, photograph by the author)
Top right: Bulged wall profile (Kom el Naggar, photograph by the author)
Bottom left: Raised wall bottom (Shabbas Ummayir, photograph by the author)
Bottom right: Entrance buttress (Kom Surad, photograph by the author)

Fig. 3.9.
Top left: Traditional door (Kom el Naggar, photograph by the author)
Top right: Jamb and pivot socket (Kom el Naggar, photograph by the author)
Bottom left: Lintel (Kom el Naggar, photograph by the author)
Bottom right: Double-leafed door with embossed decorations (Birma, photograph by the author)



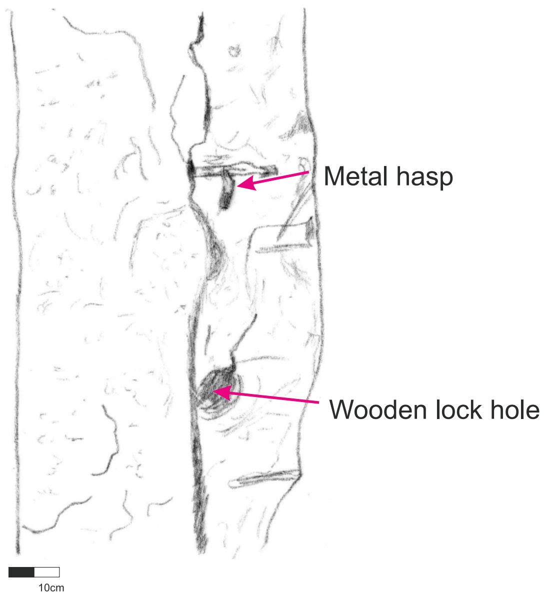


Fig 3.10
Left: traditional wooden lock with key (Kom el Naggar) (sketch by the author)
Middle: wall profile of a front door (Kom el Naggar) (sketch by the author)
Right: A variant of a traditional door (Shabbas Ummayir, photograph by the author)

a.

b.

c.

d.

e.

Fig. 3.11.
a. Opening closed with intertwined branches (Kom el Naggar, photograph by the author)
b. Widespread wooden window with metal bars (Kom el Naggar, photograph by the author)
c. Wooden window without shutters (photograph by the author)
d. Decorative grilles (Sa el-Hagar, photograph by the author)
e. Blocked opening (photograph by the author)

Fig. 3.12
a: Balcony (Kom Surad, photograph by the author)
b: Pigeonhouse on a roof (Sa el-Hagar, photograph by the author)
c: Balcony (Birma, photograph by the author)
d: Mastaba (Najrij, photograph by the author)
e: Drainage barrier (Surad, photograph by the author)

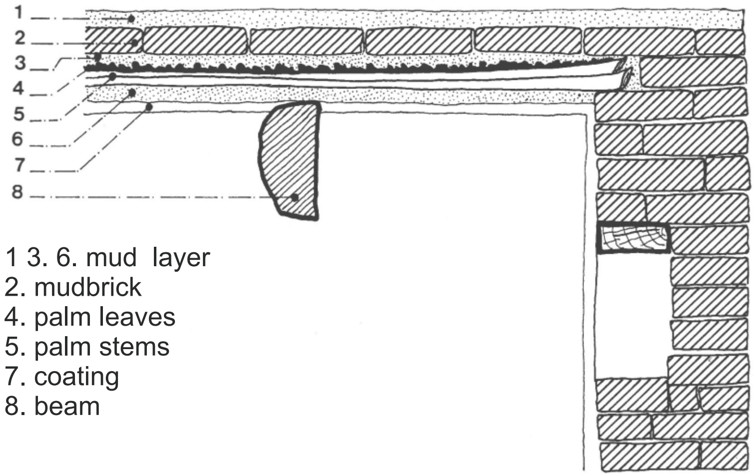
Fig. 3.13.
Top: Sturdy roof naked ceiling (Najrij, photograph by the author)
Middle: Plastered and painted ceiling (Kom el Abiad, photograph by the author)
Bottom: Wooden plank ceiling blackened by smoke (Kom el Abiad, photograph by the author)

Fig. 3.14.
Top: Palm tree and flower decorations (Surad, photograph by the author)
Middle: Internal door raised from floor (Hissat Abbar, photograph by the author)
Bottom: mud floor (Kom el Naggar, photograph by the author)

Fig. 3.15.
Top: Mud containers (Kom el Naggar, photograph by the author)
Middle: pigeonholes (Surad, photograph by the author)
Bottom: Wall niche (Hissat Abbar, photograph by the author)

Fig. 3.16.
Top left: Solid staircase (Kom el Naggar, photograph by the author)
Bottom left: Wooden tread (Kom el Naggar, photograph by the author)
Right: Staircase cupboard (Hissat Abbar, photograph by the author)

Fig. 3.17.
Left: Oven on the side of a deteriorated solid staircase (Najrij, photograph by the author)
Top right: Oven (Kom Surad, photograph by the author)
Bottom right: Bread oven (Kom Surad, photograph by the author)



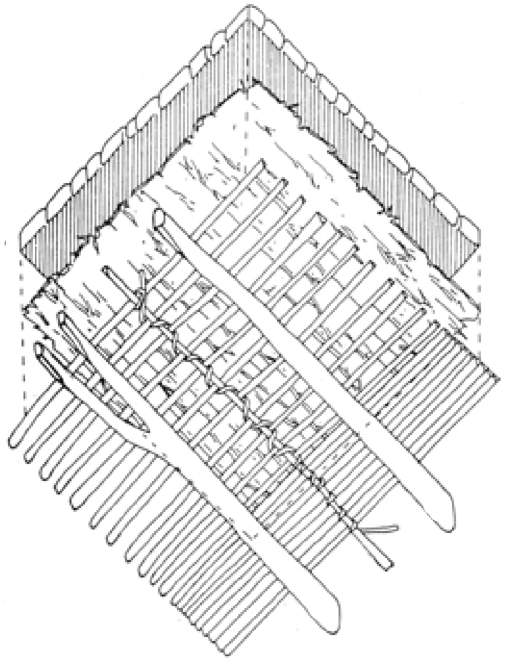


Fig. 3.18.
Top left: flat mud roof (Qurna, photograph by the author)
Top right: diagram showing roof layers in Mari Girgis (Hessein 1988, 43)
Bottom left: diagram showing roof layers in Qurnet Marei (Castel 1984, 139)
Bottom right: Dry branches roof and piled straw in an animal courtyard (Qurna, photograph by Caroline Simpson)

Fig. 3.19.
Top left: ruins of a vault with square buttress (Qurna, photograph by Caroline Simpson)
Top right: interior view of a square-buttressed vault (Qurna, photograph by Caroline Simpson)
Bottom left: thin wheat stem ready for use (Dendera, photograph by the author)
Bottom right: mudbrick factory (Dendera, photograph by the author)

Fig. 3.20.
Top left: extended lintel (Qift, photograph by the author)
Top right:bonding with brick on edge (Qurna, photograph by the author)
Bottom left: two wall leaves tied with branches (Qift, photograph by the author)
Bottom right: low and high walls built with pots (Naqada, photograph by the author)

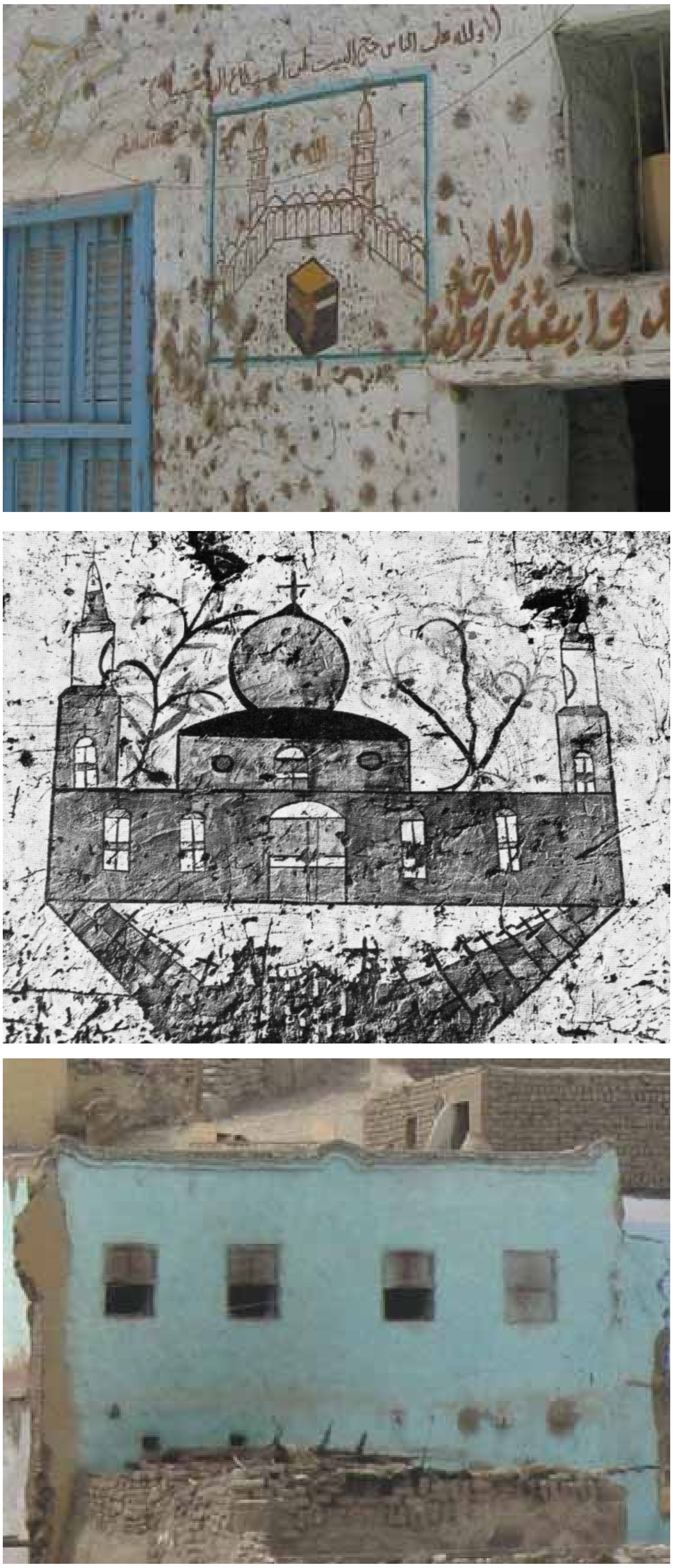
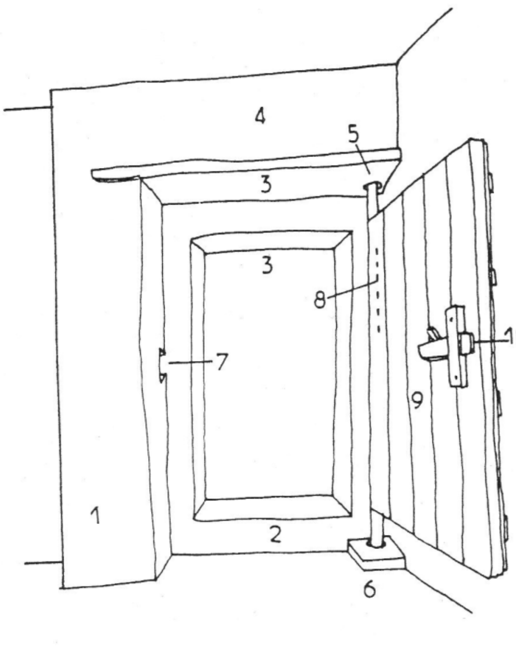
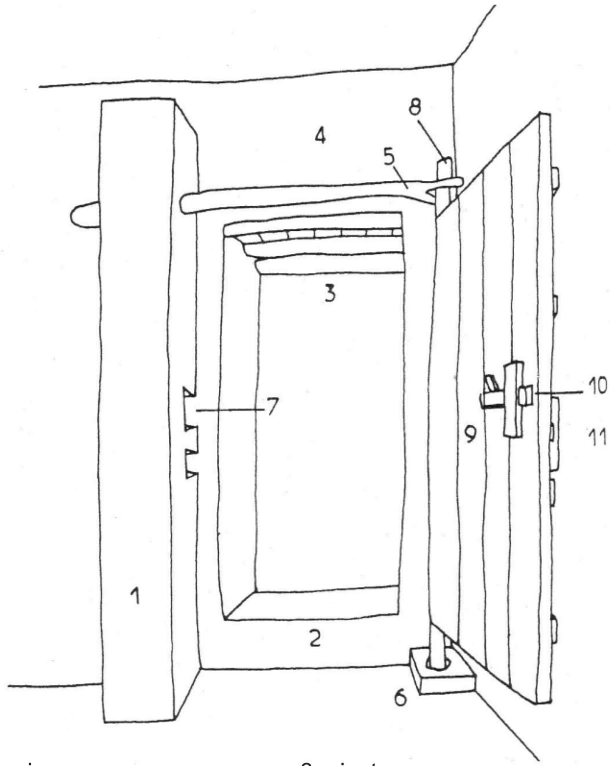
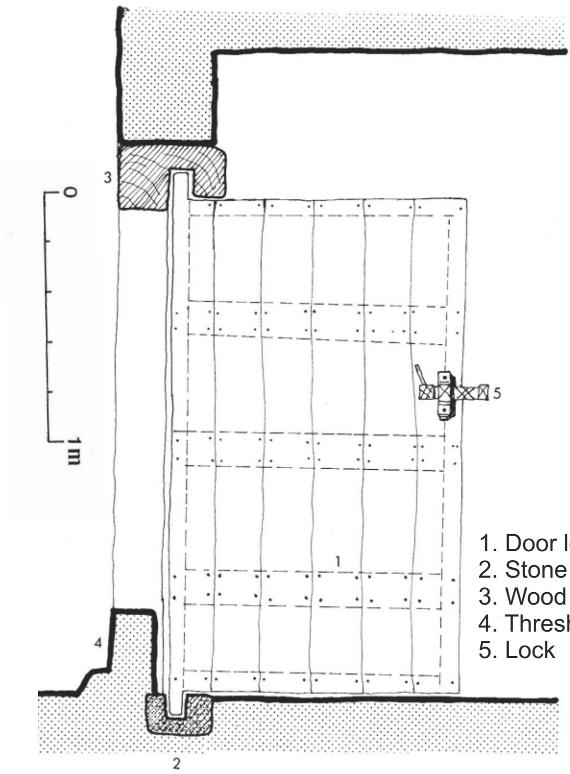


Fig. 3.21.
Top: Hajj (Mecca pilgrimage) decorations (Hiw, photograph by the author)
Middle: Jerusalem pilgrimage decorations (Mari Girgis, Hessein 1988, pl.7)
Bottom: Decorative facade moulding (Qurna, photograph by the author)





1. buttress
2. threshold
3. arch
4. wall above opening
5. pivot fork
6.pivot socket
7. lock hole
8. pivot
9. wood planks
10. external lock
11. internal lock



1. Door leaf
2. Stone socket
3. Wood lintel
4. Threshold
5. Lock

Fig. 3.22.
Top: two door types in Qurnet Marei (Castel 1984, 140)
Bottom left: typical door in Mari Girgis (Henein 1988, 45)
Bottom right: entrance step (Naqada, photograph by the author)

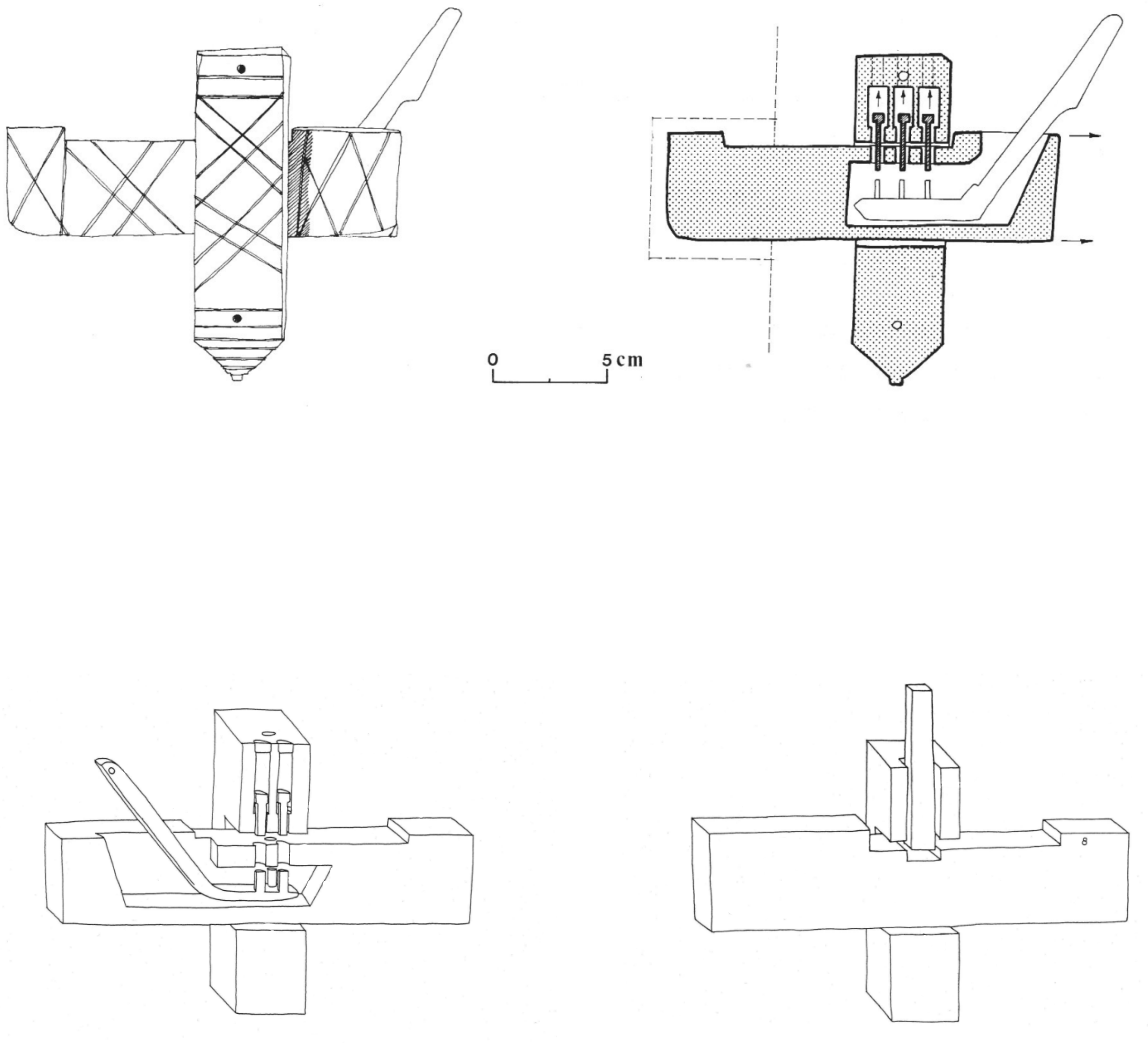


Fig. 3.23.
Top: front and back of a wooden lock in Mari Girgis (Henein 1988, 45)
Bottom left: external (sometimes internal) wooden lock with key in Qurnet Marei (Castel 1984, 143)
Bottom right: internal wooden lock without key in Qurnet Marei (Castel 1984, 144)

Fig. 3.24.
Top: Decorated lintel in a walled door (Shenhur, photograph by the author)
Middle: A rare columned entrance (Naqada, Hassan Fathy collection, © Rare Books and Special Collections Library, The American University in Cairo
Bottom: arched lintel and white plate decoration (unspecified, Lozach and Hug 1930, book II, pl. VIII)

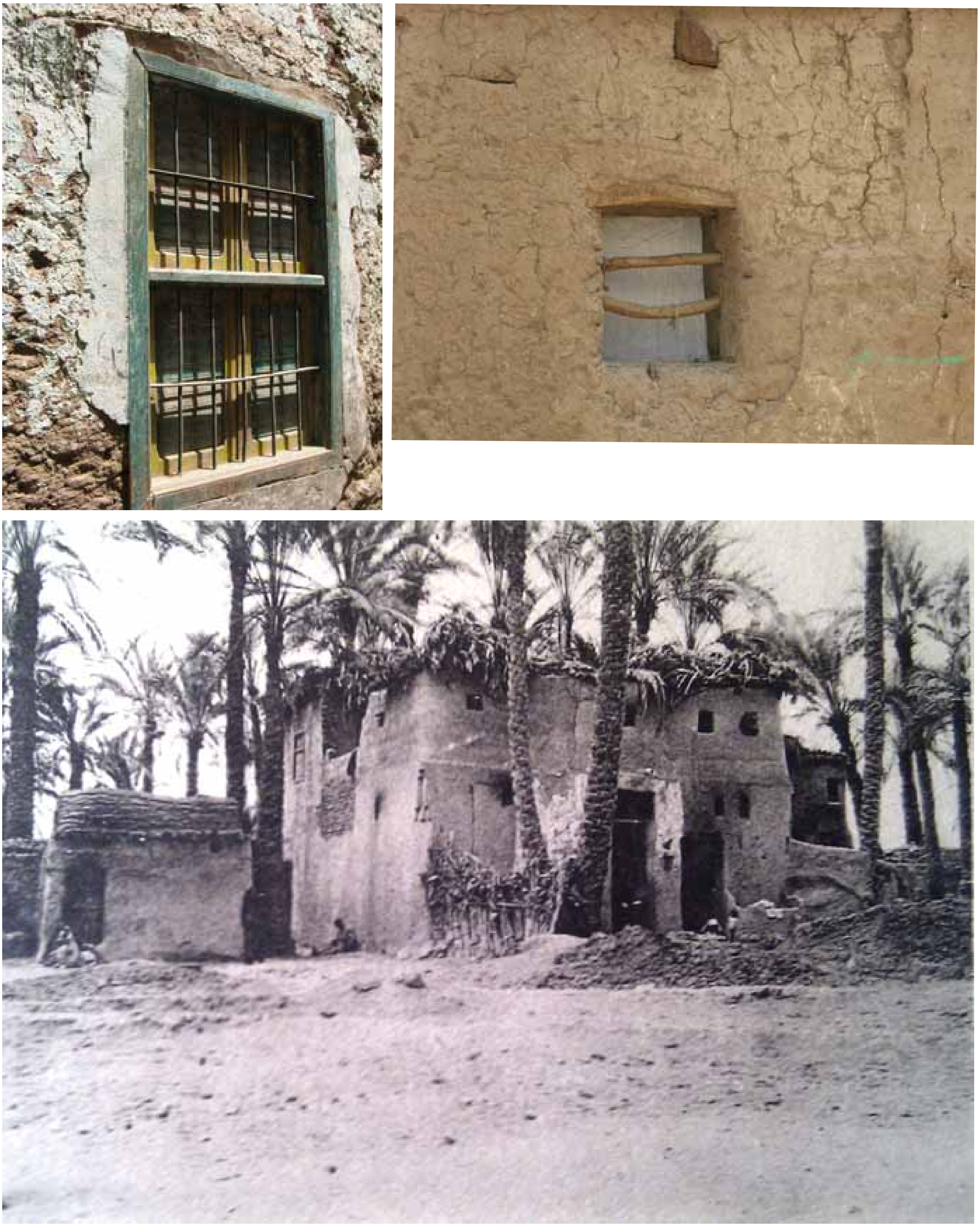


Fig. 3.25.
Top left: Wooden window with shutters and metal bars (Shenhur, photograph by the author)
Top right: Small opening closed with branches (Dendera, photograph by the author)
Bottom: House with high small windows similar to those described for Upper Egypt
(Beni Suef, Lozach and Hug 1930, book II, pl.IX)

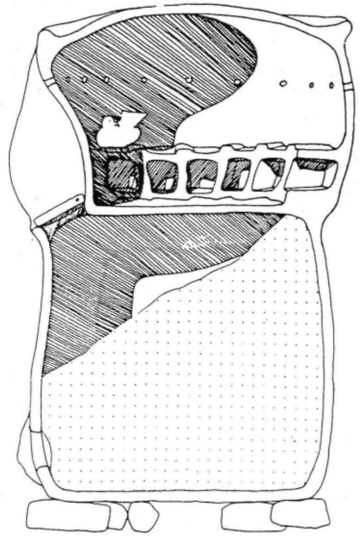
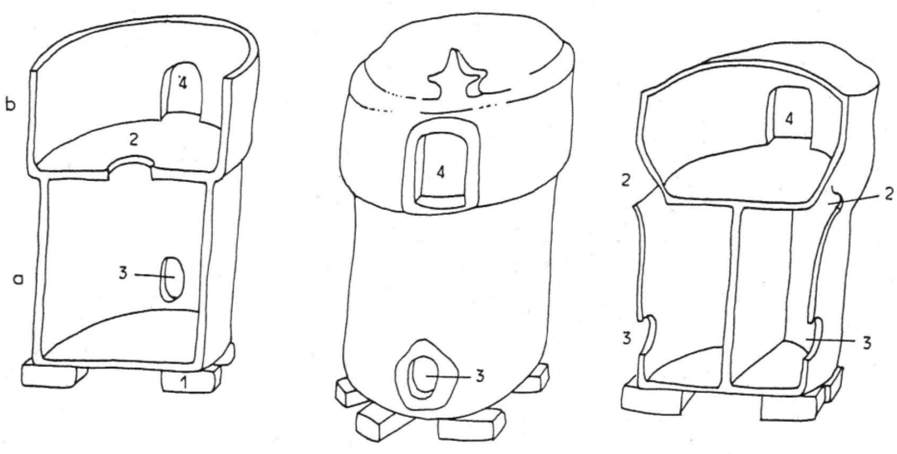


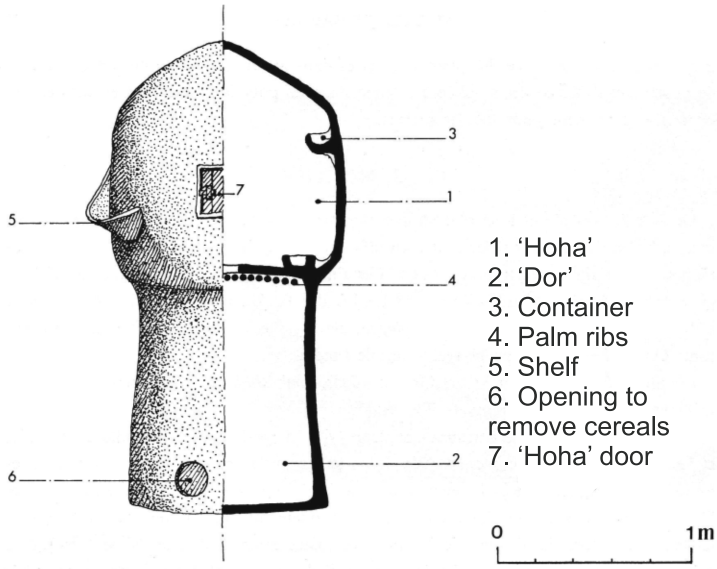
Fig. 3.26.
Top left: passage between two buildings (Naqada, photograph by the author)
Top middle: pigeon tower (Henein, 1984, pl. V)
Top right: Pigeonhouse (Qurnet Marei, Castel 1984, 149)
Bottom left: mastaba in a courtyard, next to front door (Qurna, photograph by Caroline Simpson)
Bottom right: wooden bench (Dra Abu el Naga, photograph by Caroline Simpson)

Fig. 3.27.
Top: plastered and painted ceiling (Dendera, photograph by the author)
Bottom: Interior window (Dendera, photograph by the author)

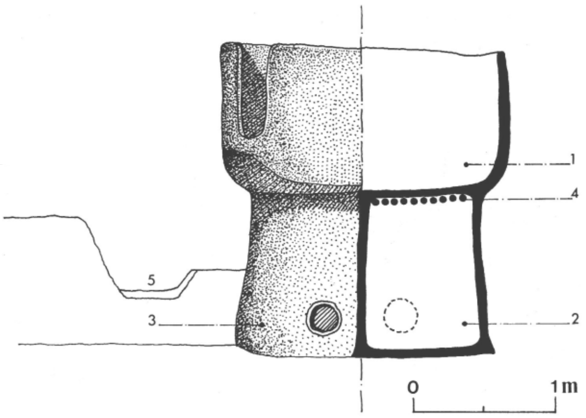


a. Grain reserve
b. Cupboard

1. Stones/mudbricks
2. Refilling opening
3. Emptying opening
4. Door



1. ‘Hoha’
2. ‘Dor’
3. Container
4. Palm ribs
5. Shelf
6. Opening to remove cereals
7. ‘Hoha’ door



1. Bed
2. ‘Dor’ for corn
3. ‘Dor’ for wheat
4. Palm ribs
5. Step

Fig. 3.28.
Top: Safat (Castel 1984, 147)
Middle: Hoha and dor (Henein 1988, 50)
Bottom: nawwama (Henein 1988, 51)

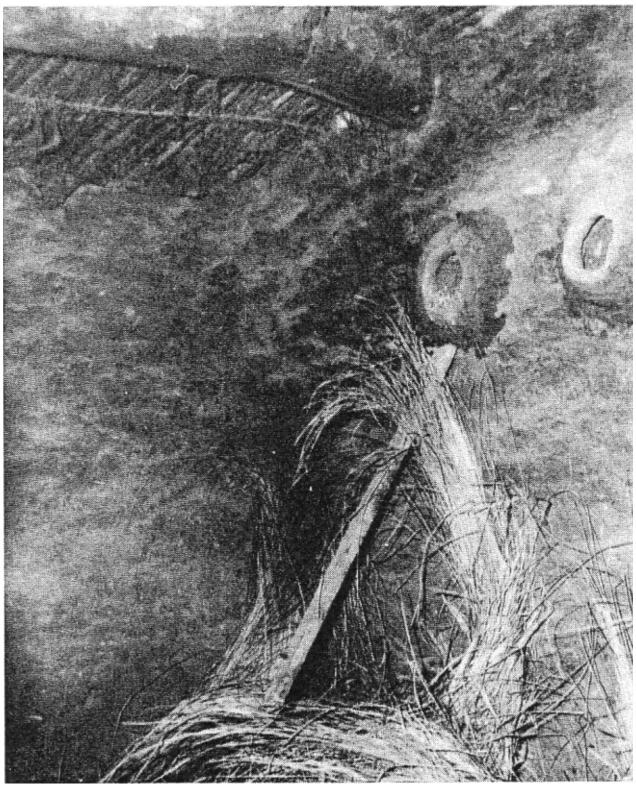
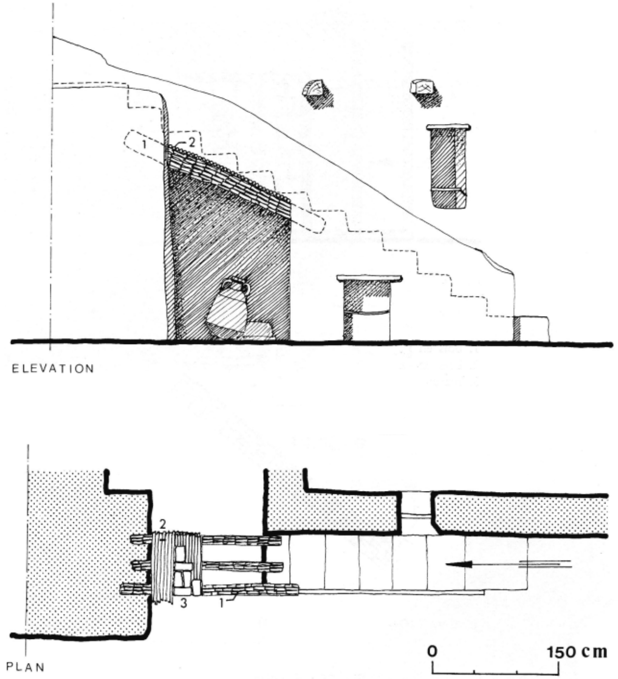
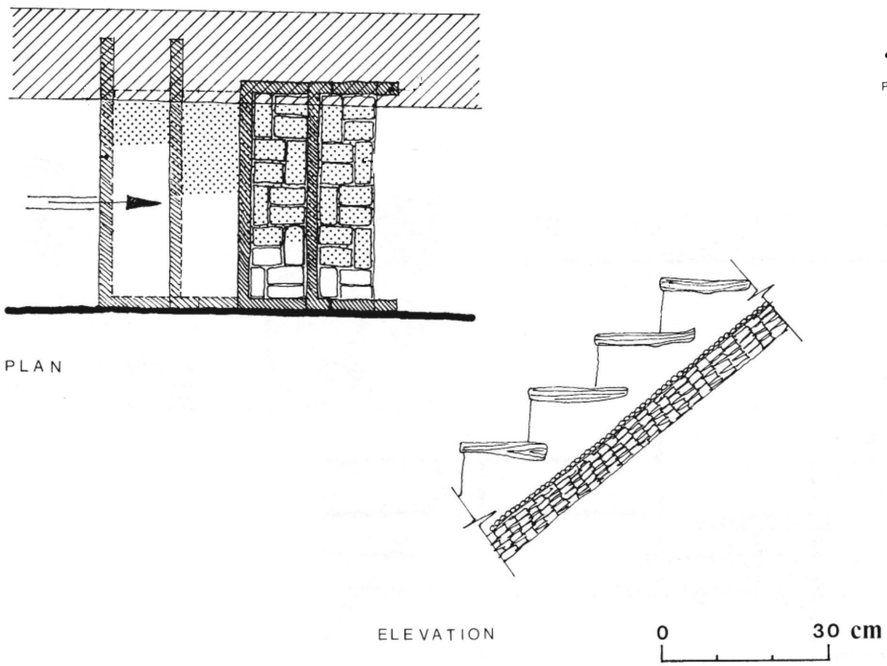


Fig. 3.29.
Top: pigeonholes in Qurnet Marei (Castel 1984, 183)
Bottom: wall niche (Dendera, photograph by the author)





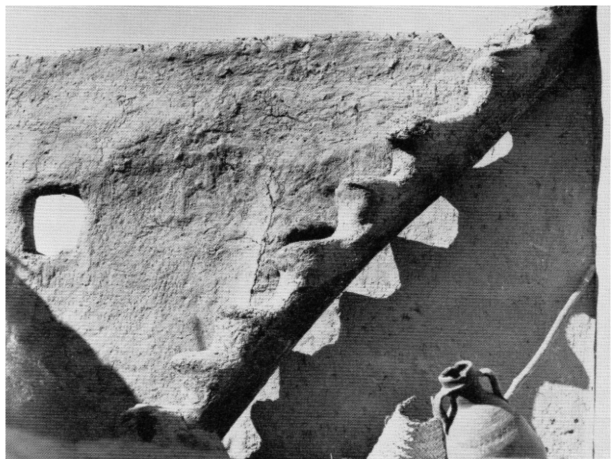
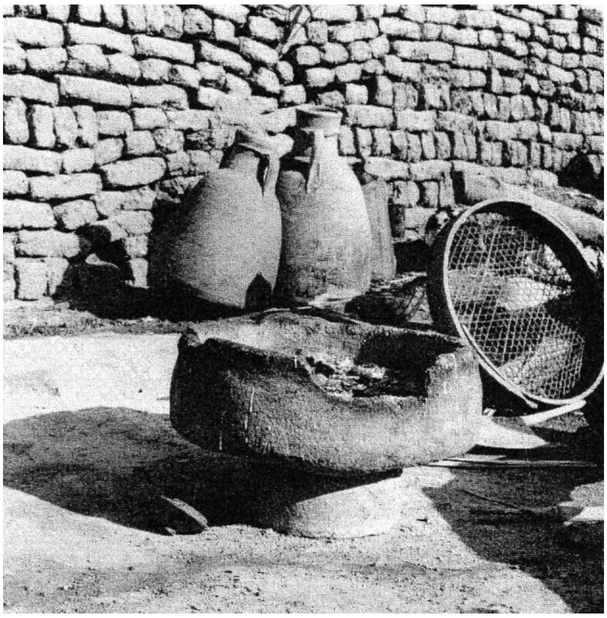
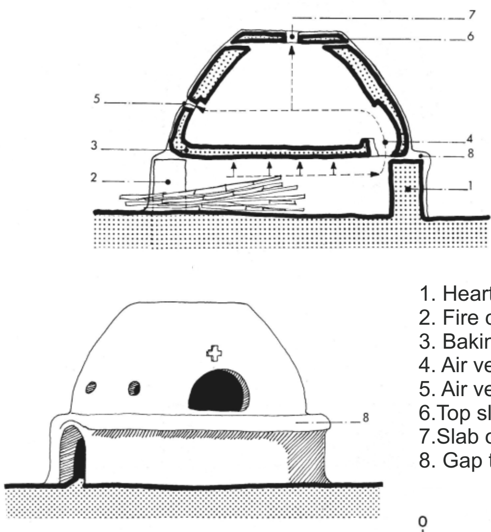


Fig. 3.30.
Top left: suspended staircase (Dendera, photograph by the author)
Top right: plan and elevation of solid staircase (Henein 1988, 47)
Bottom left: wooden treads (Henein 1988, 48)
Bottom right: suspended staircase leading to terrace (Henein 1988, pl.8)





1. Hearth
2. Fire chamber opening
3. Baking chamber
4. Air vents
5. Air vents
6.Top slab
7.Slab opening
8. Gap to rest the bread

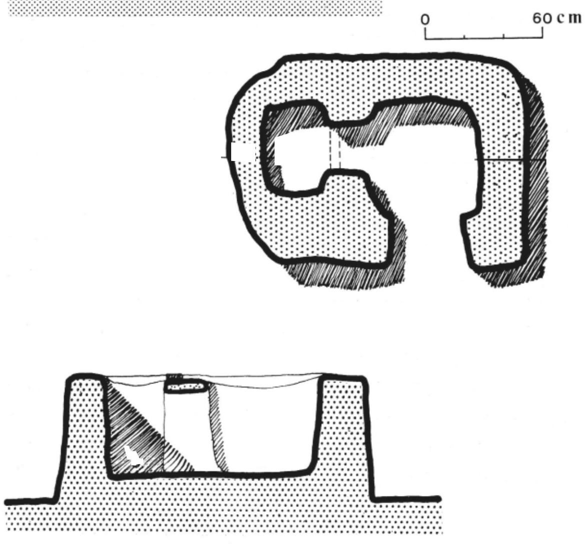


Fig 3.31.
Top: Brazier (Castel 1984, 180)
Middle: Elevation and section of bread oven (Henein 1988, 158)
Bottom: *Kanun* or stove (Henein 1988, 159)

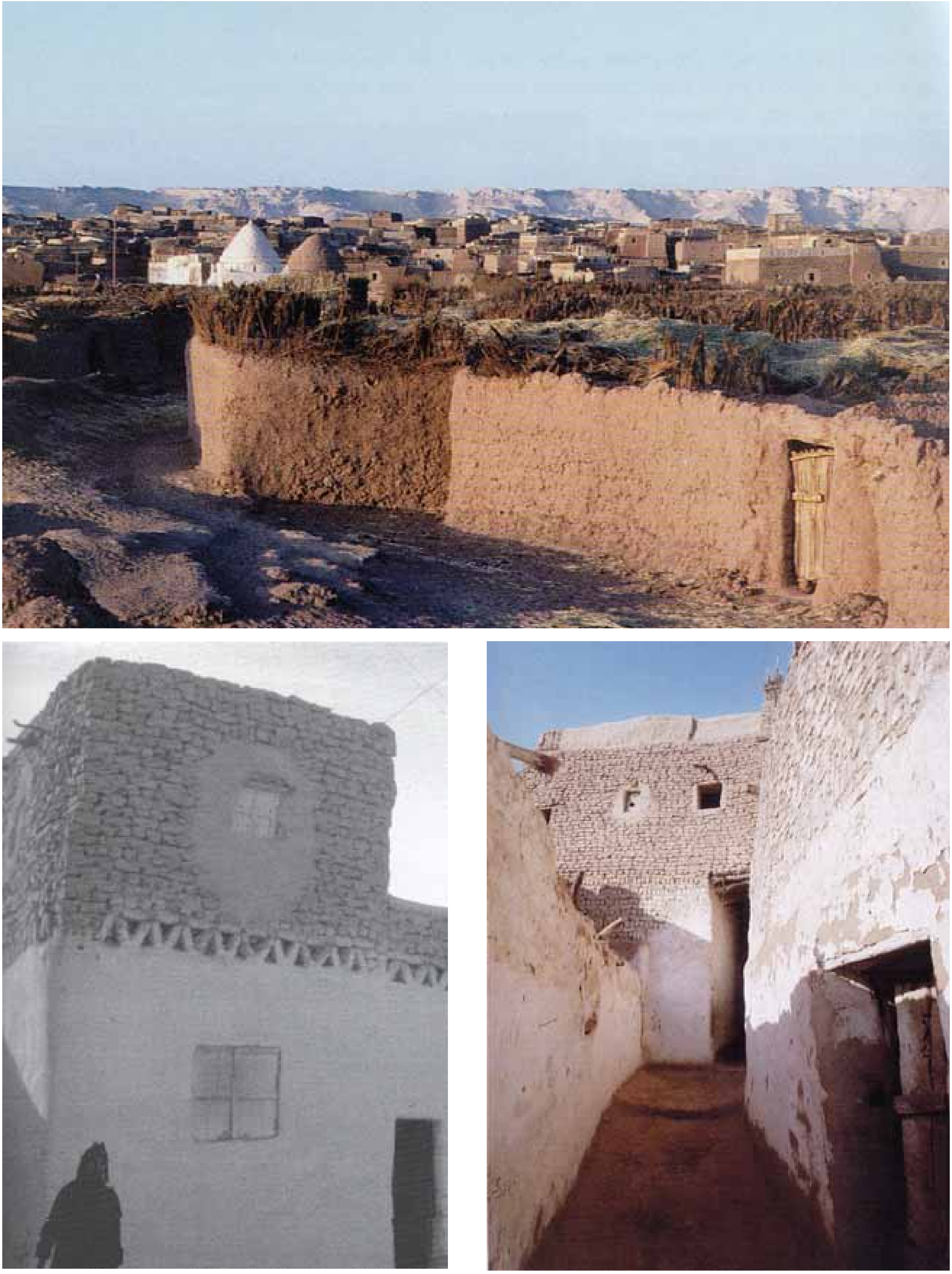


Fig. 3.32.
Top: Wattle and daub fences (Balat, Hivernel 1996, x)
Bottom left: Stretchers and headers bond (Hivernel 1996, xi)
Bottom right: Brick on edge and stretchers bond (Hivernel 1996, xiii)

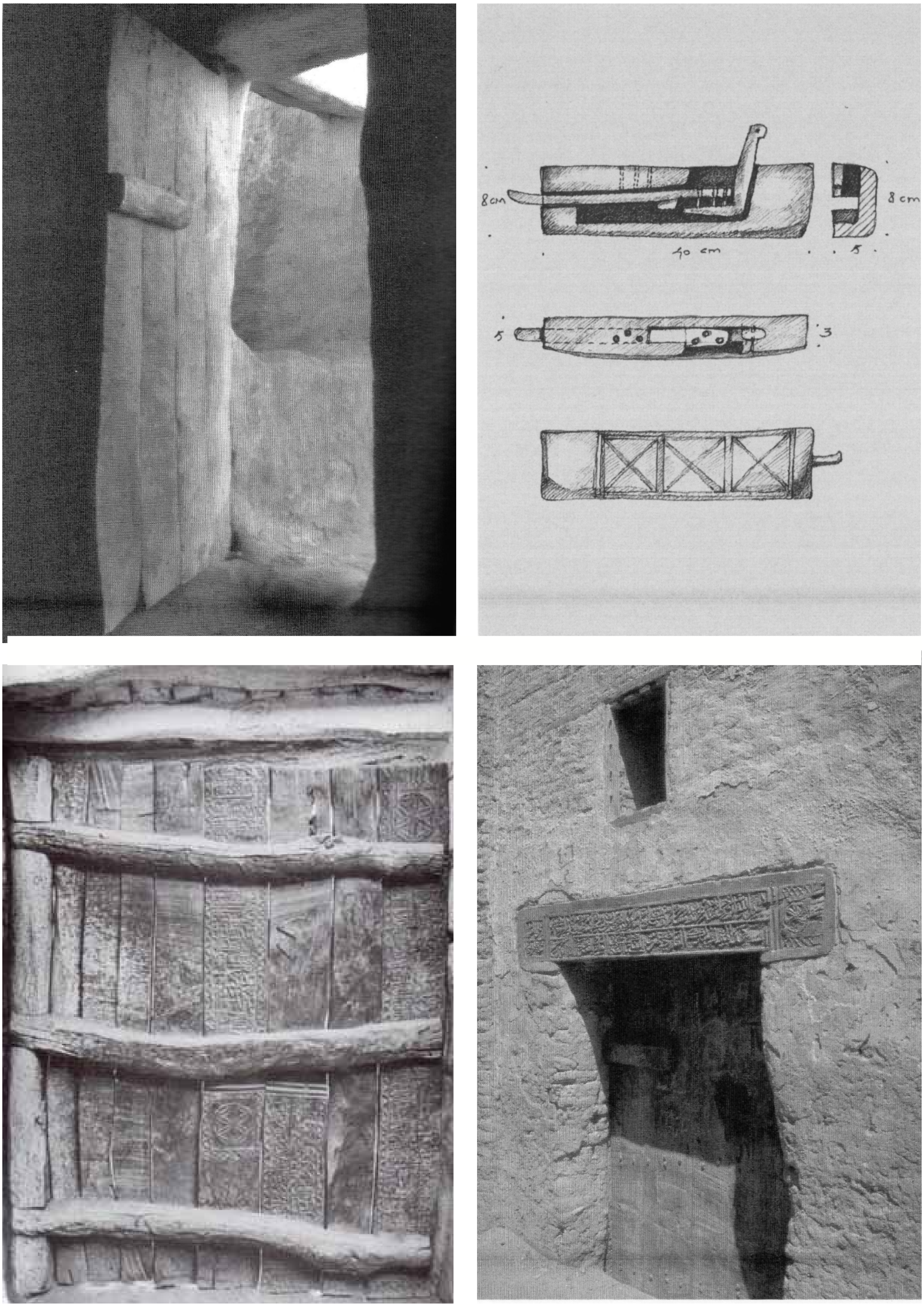


Fig. 3.33.
Top left: Traditional door (Bashendi, Schjins 2008, 28)
Top right: Traditional lock (Schjins 2008, 28)
Bottom left: Door with reused lintels (Hivernel 1996, 33)
Bottom right: Traditional lintel with inscribed lineage (Al Qasr, Schjins 2008, 20)

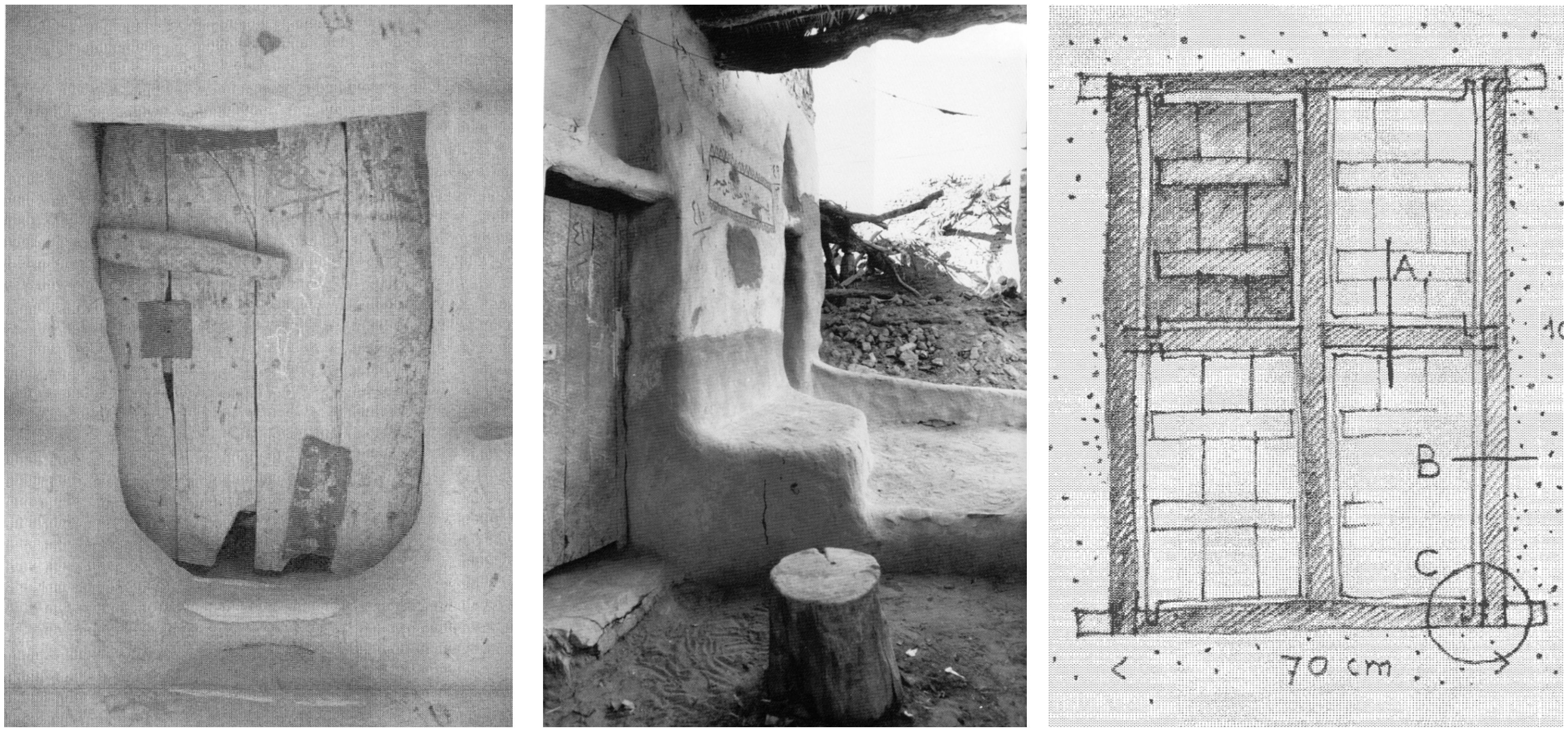
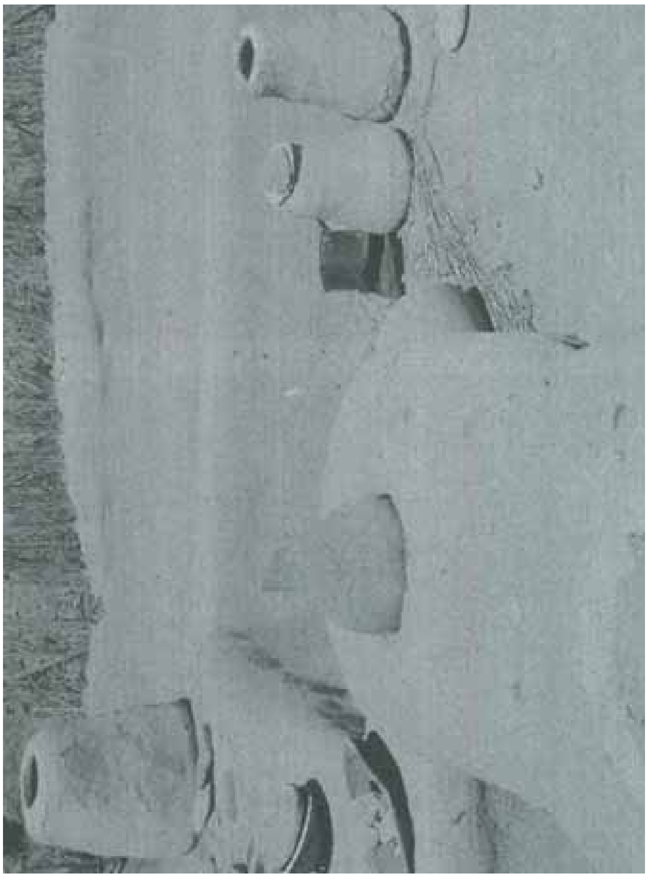


Fig 3.34.
Left: round-bottomed door (Balat, Schjins 2008, 26)
Middle: triangular decoration above door and mastaba (Balat, Hivernel 1996, xx)
Right: traditional four-panelled window (Mut, Schjins 2008, 17)



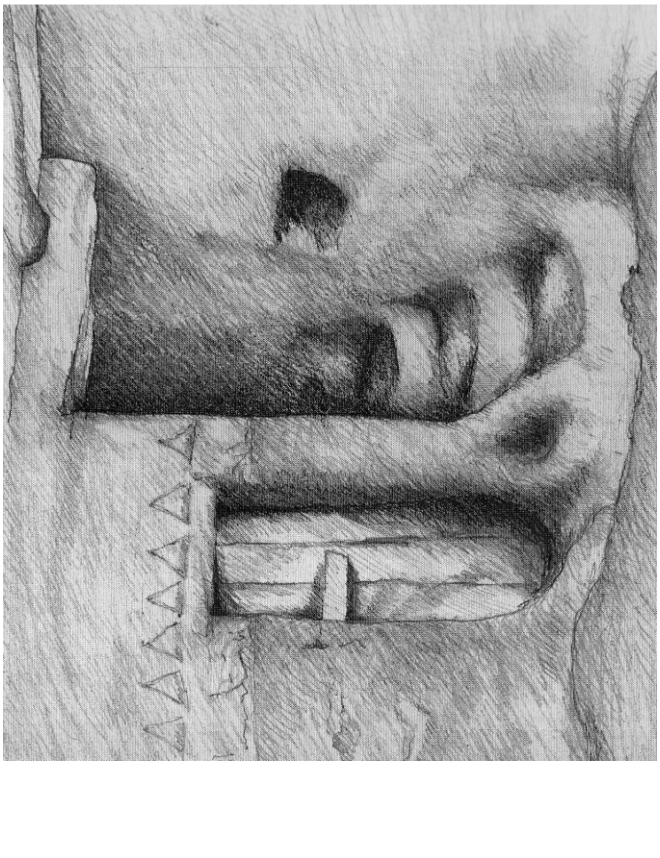
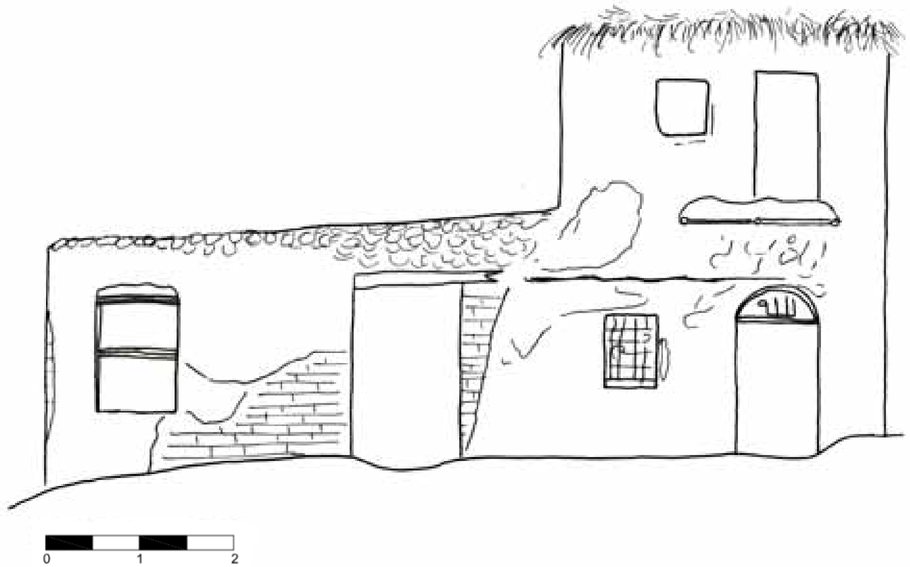
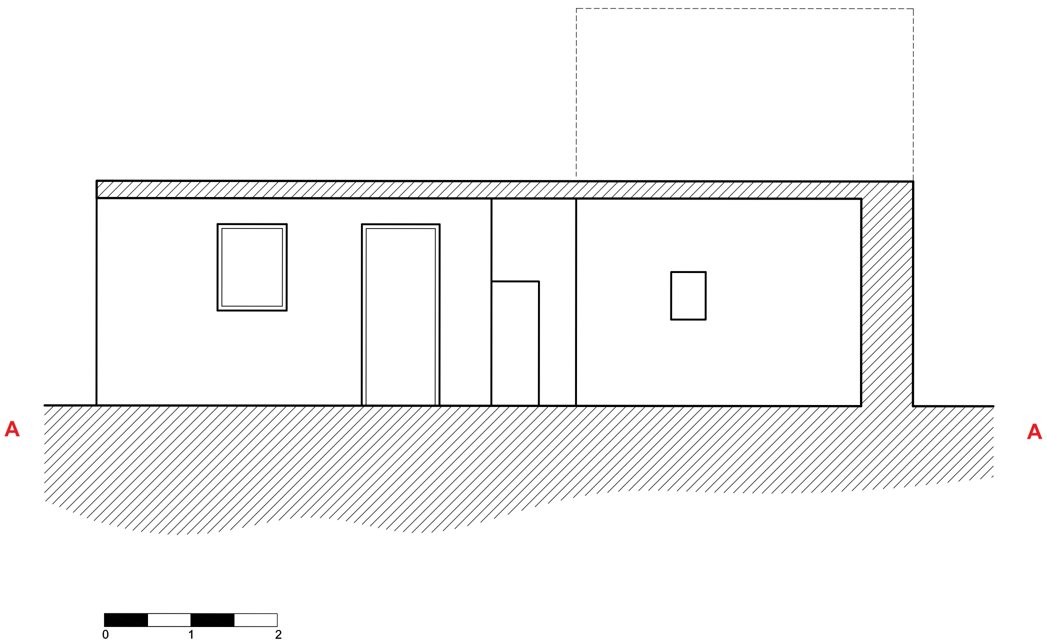


Fig 3.35.
Top left: windows (al-Qasr, De Filippi 2006, 5)
Top right: mastaba (Balat, Hivernel 1996, xvii)
Bottom left : staircase and cavity for storage jar (Bashendi, Schjins 2008, 26)
Bottom right: mud containers on terrace (Balat, Schjins 2008, 47)





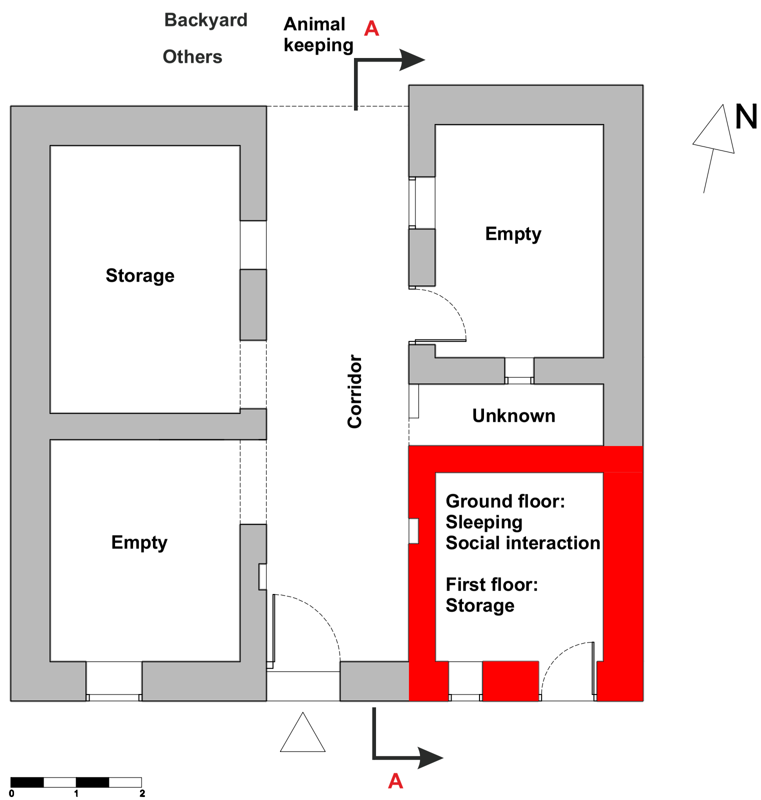


Fig. 3.36. NAJ03. Top left: Front facade elevation
Bottom right: A-A section
Bottom right: Floor plan (showing first floor plan in red)

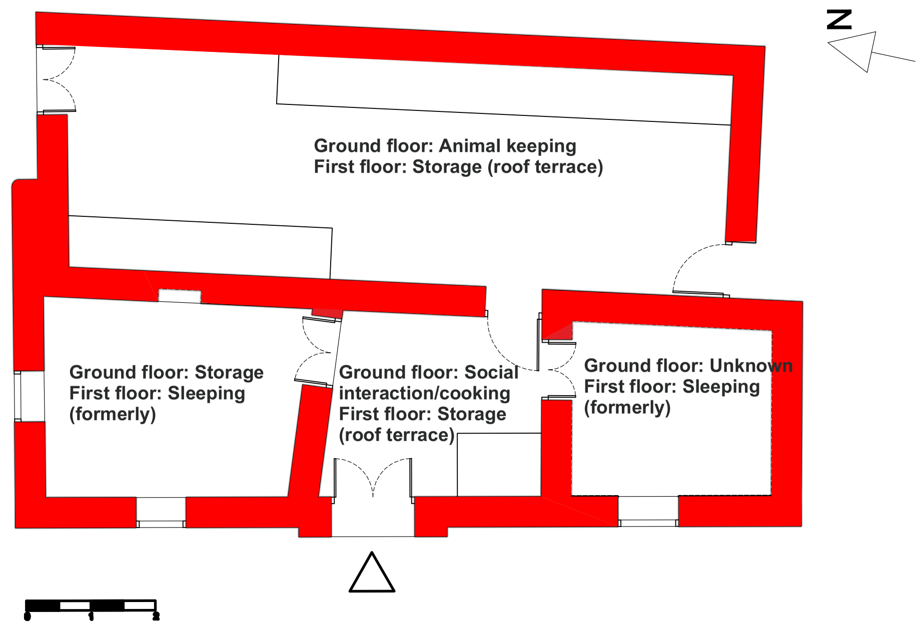
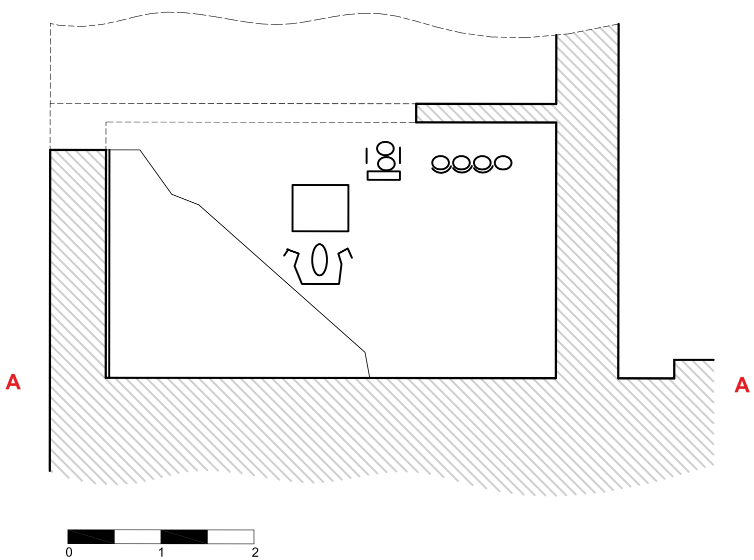


Fig. 3.37. KEA01. Top left: Front facade elevation
Bottom left: North facade elevation
Bottom right: Floor plan (showing first floor plan in red)



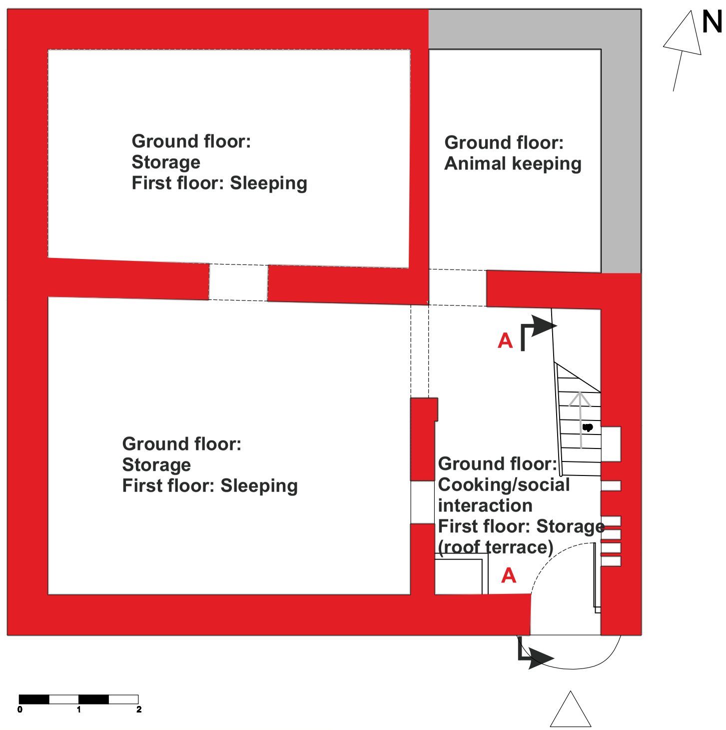
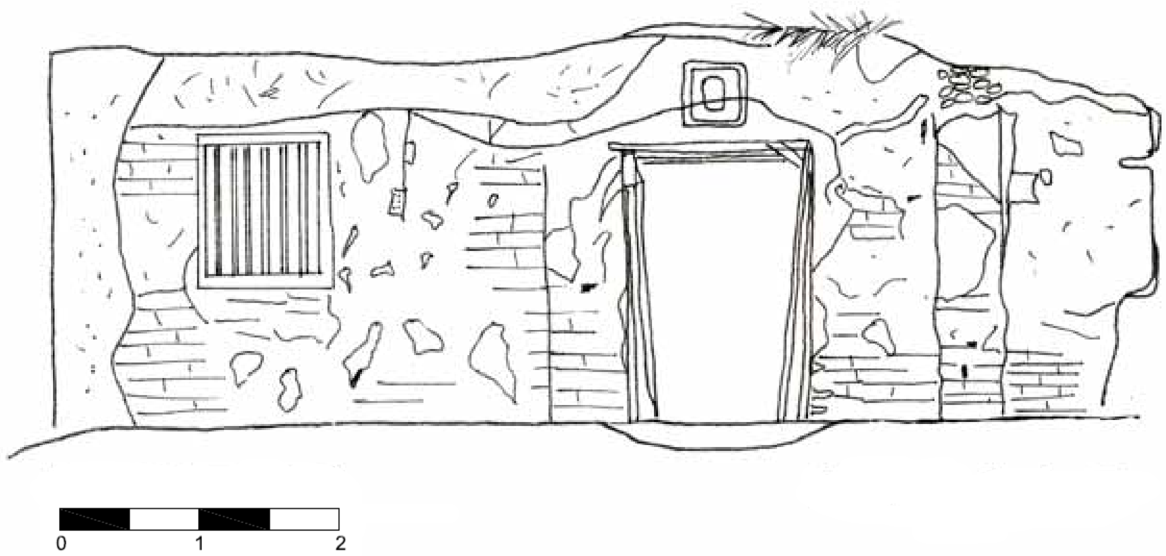


Fig. 3.38. KEN01. Top left: front facade elevation
Bottom left: A-A section
Bottom right: Floor plan (showing first floor plan in red)



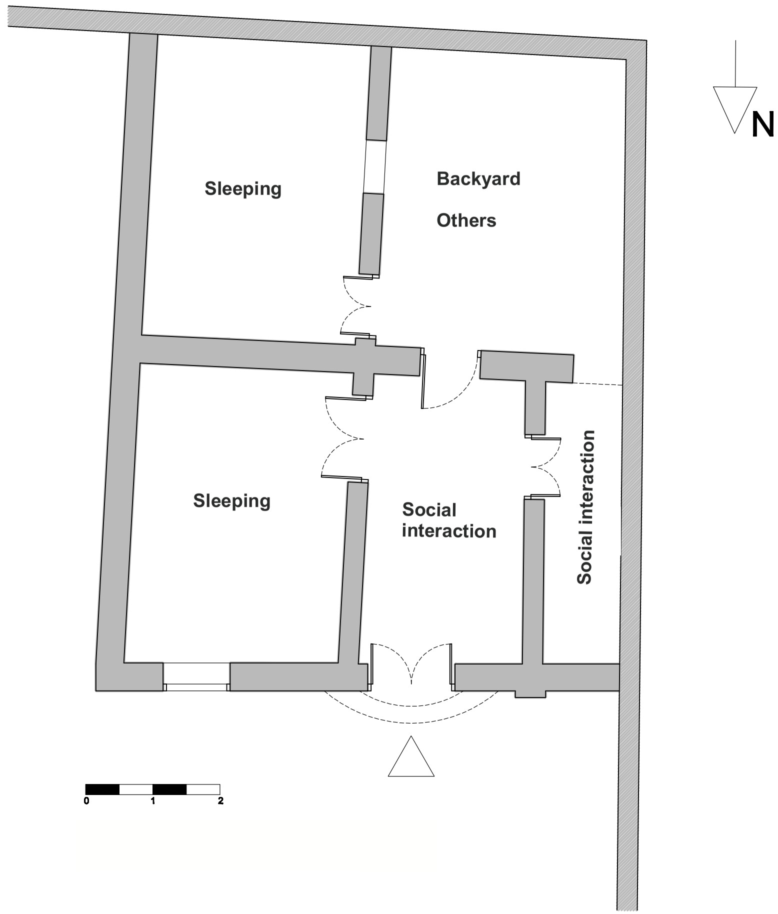
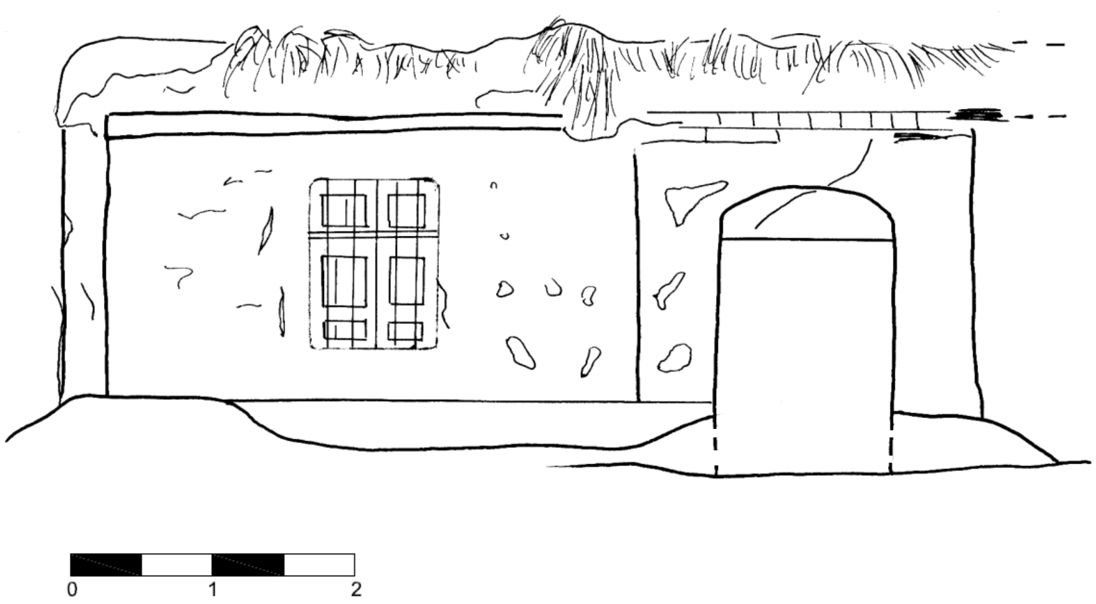


Fig. 3.39. SUR01.Left: Front facade elevation
Right: Ground floor plan



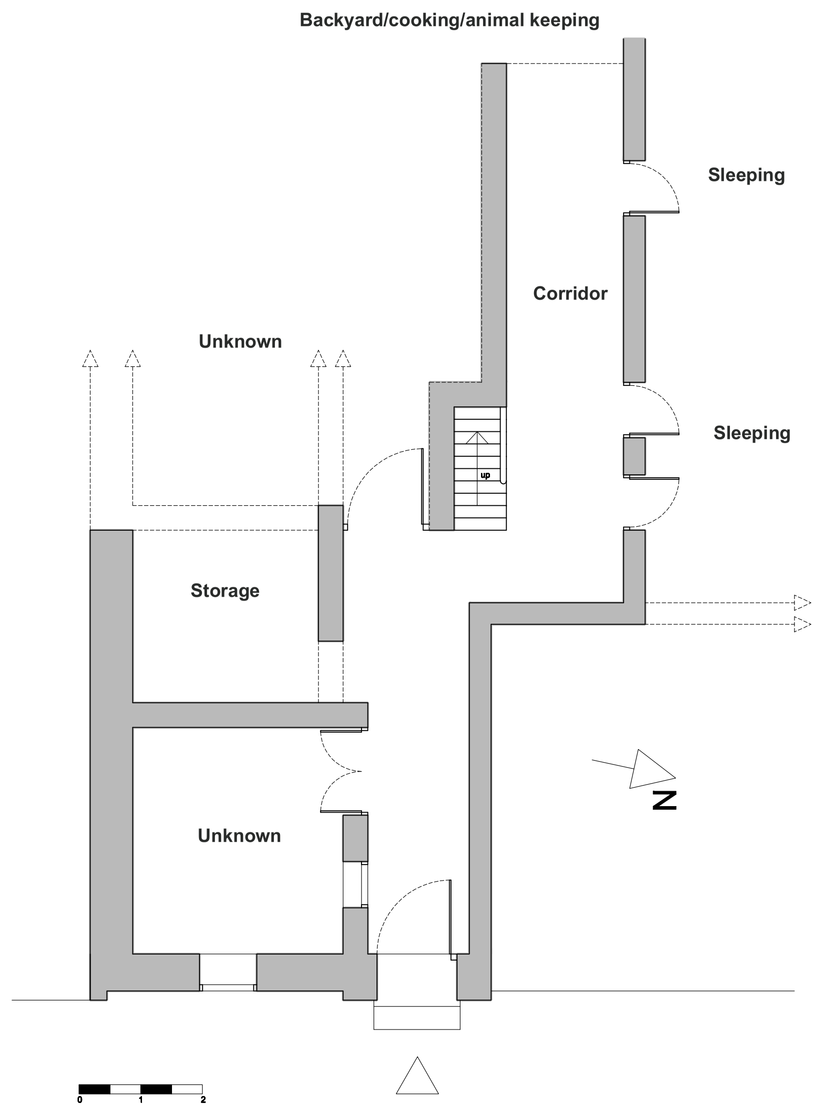
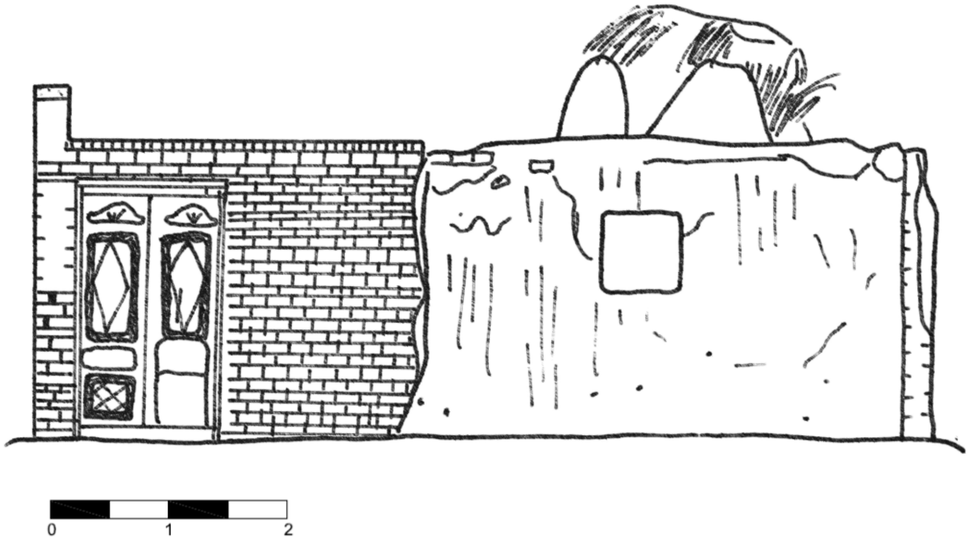


Fig. 3.40. HAB01. Left: Front facade elevation
Right: Ground floor plan



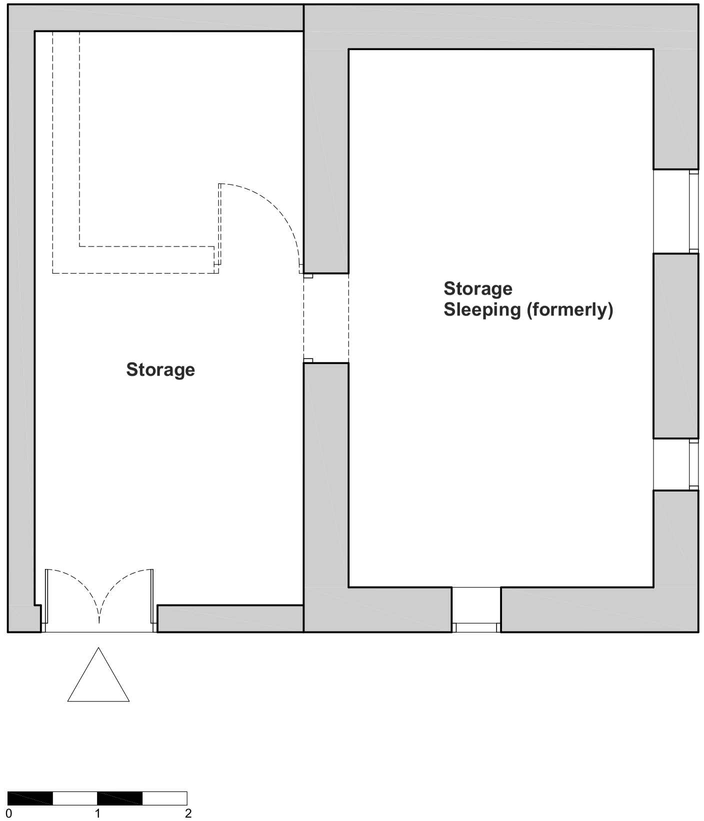
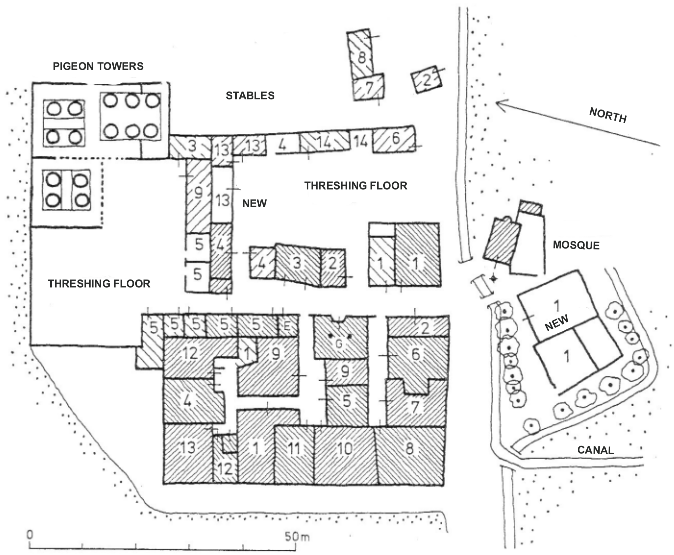


Fig. 3.41. SEH01. Left: front facade elevation
Right: ground floor plan



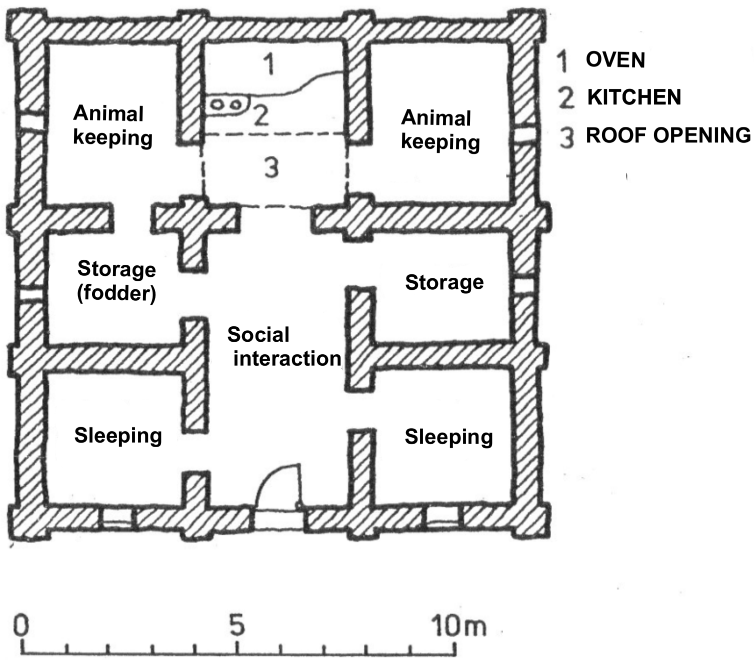


Fig. 3.42. Top left: Plan of Ezbet Machali (Eigner 1984, 9)
Top right: View of a street in Ezbet Machali (Eigner 1984, 122)
Bottom left: Plan of Ezbet Mehesin (Eigner 1984, 23)
Bottom right: Standard ground plan of Ezbet Machali (applicable to Ezbet Mehesin with minor variations, Eigner 1984, 11)

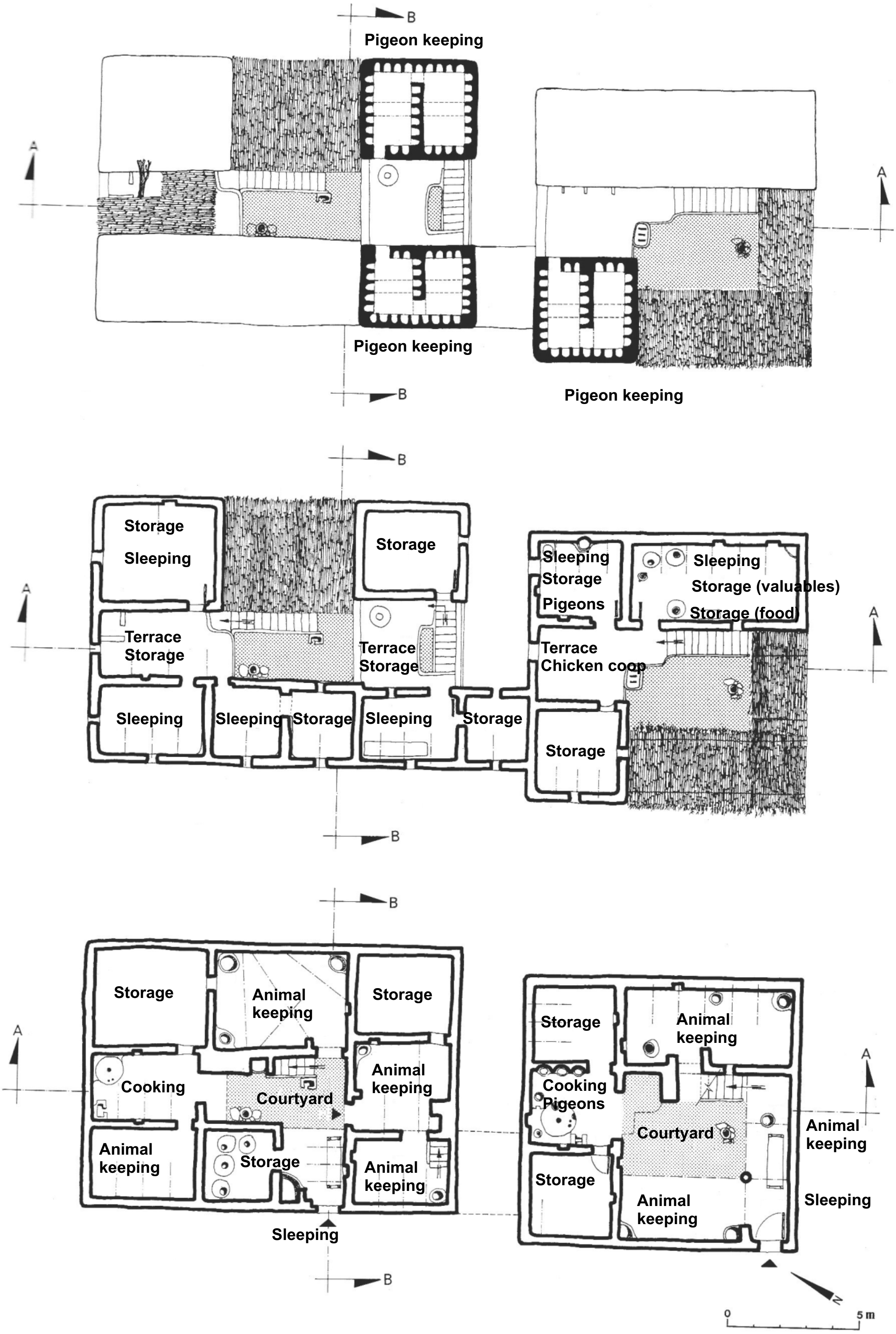


Fig. 3.43. House of Hagras, Garas et Girgis and House of Tawfig and Safig. From top to bottom: second, first and ground floor plans (Henein 1988, 21).

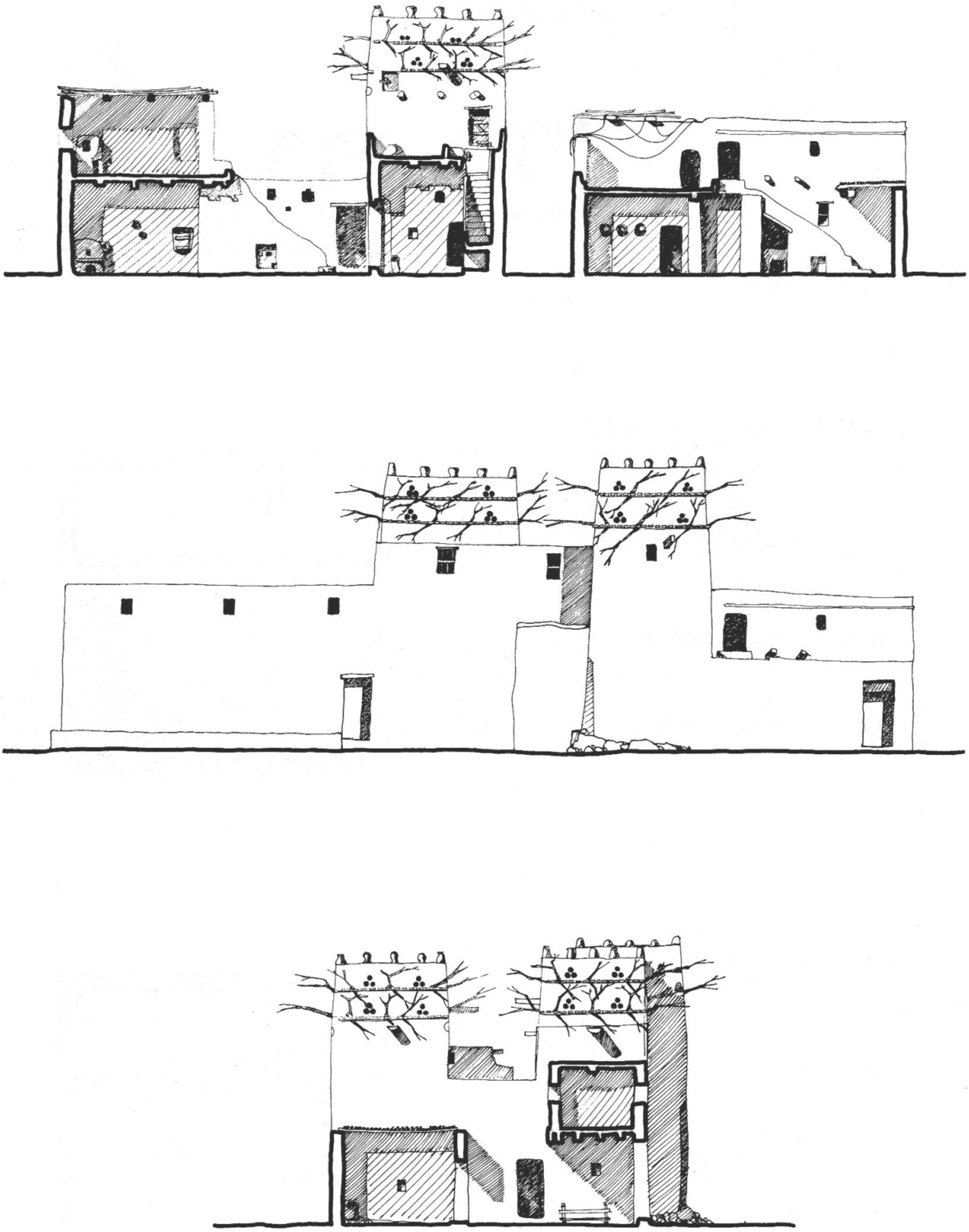


Fig. 3.44. House of Hagras, Garas et Girgis and House of Tawfig and Safig. From top to bottom: section A-A, west elevation and section B-B (Henein 1988, 22).

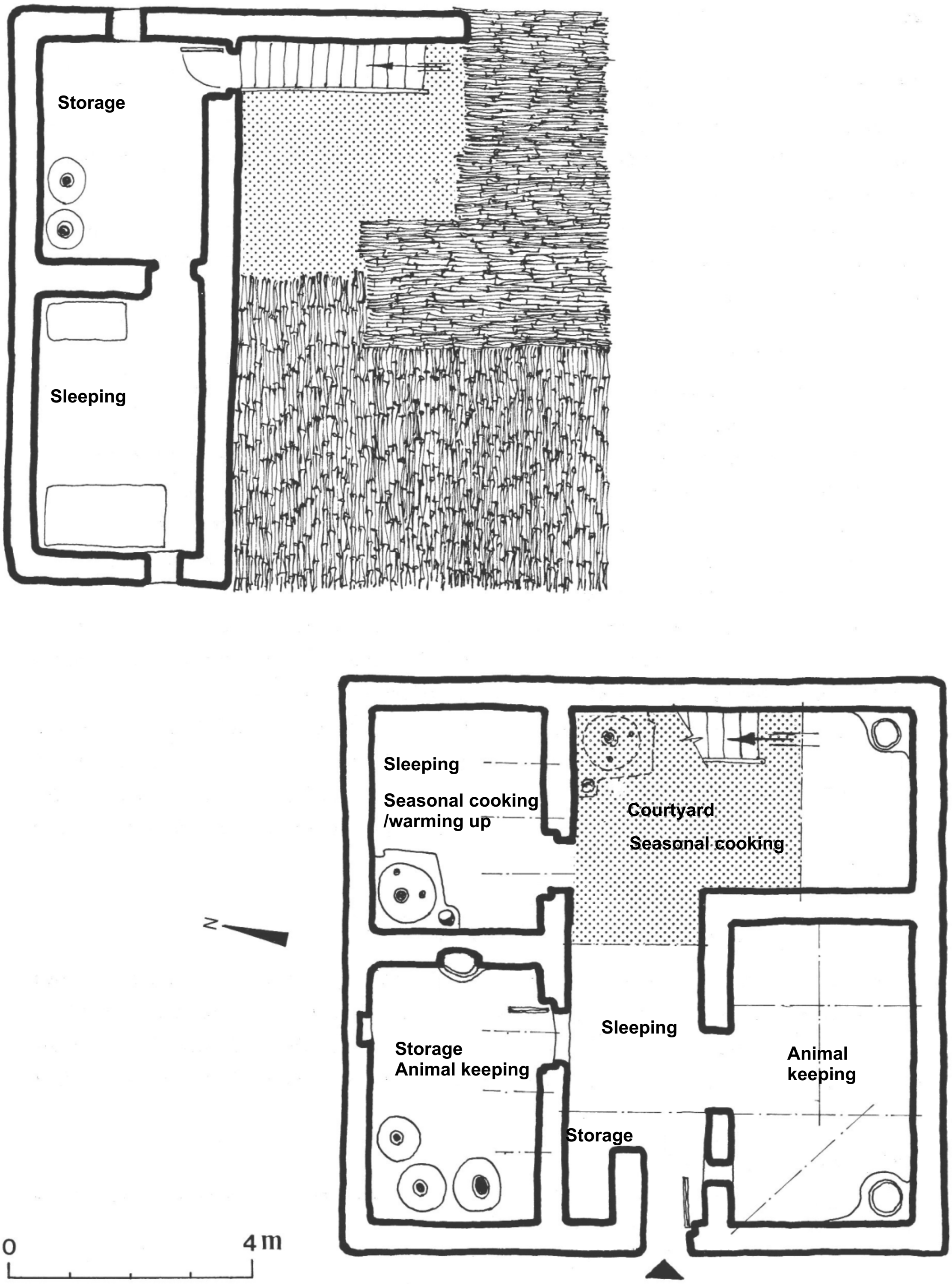


Fig. 3.45. House of Sawgi Gayyed, first and ground floor plans.

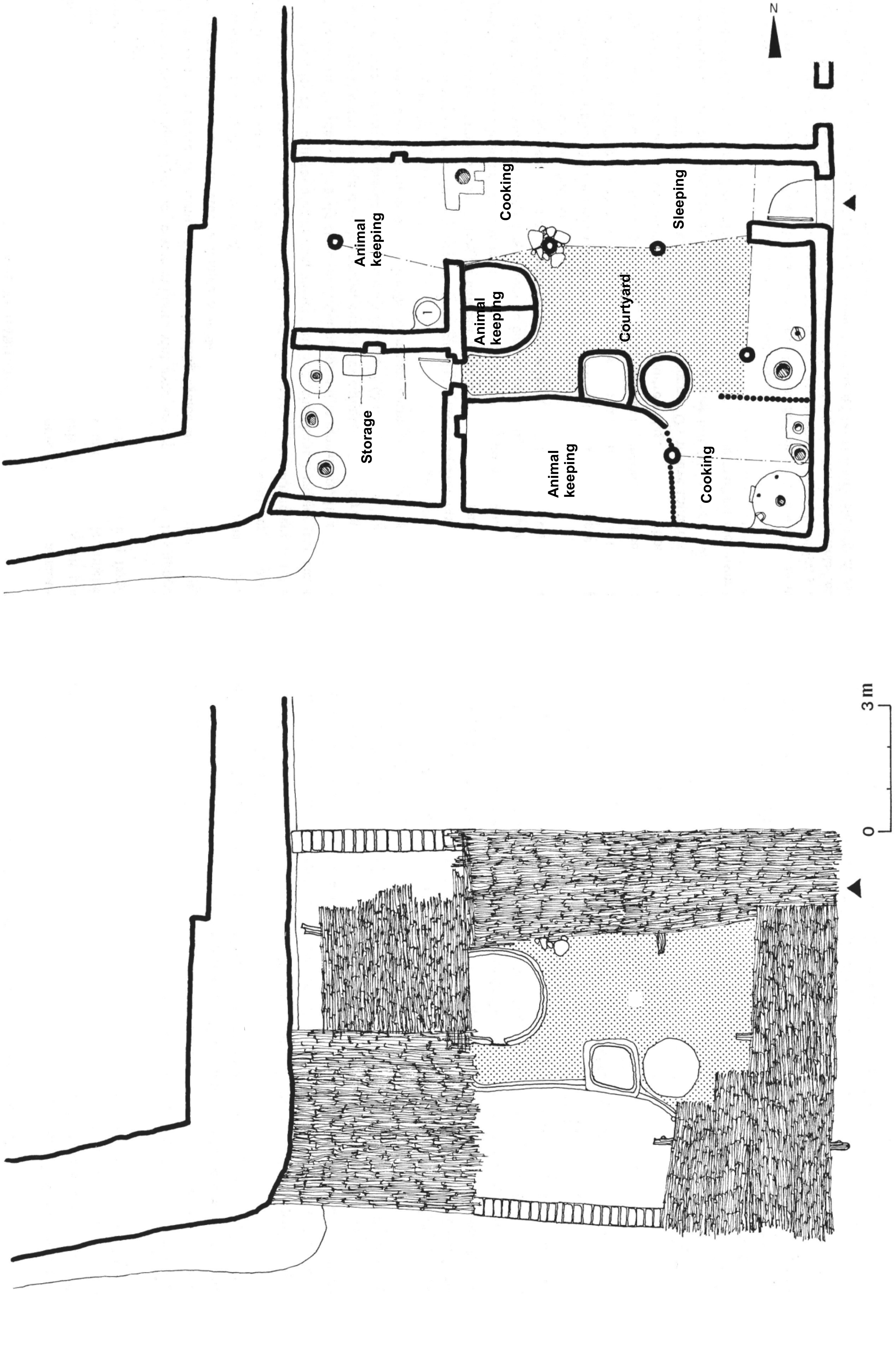


Fig. 3.46. House of Adli Masud: Roof plan and ground floor plan (Henein 1988, 25).

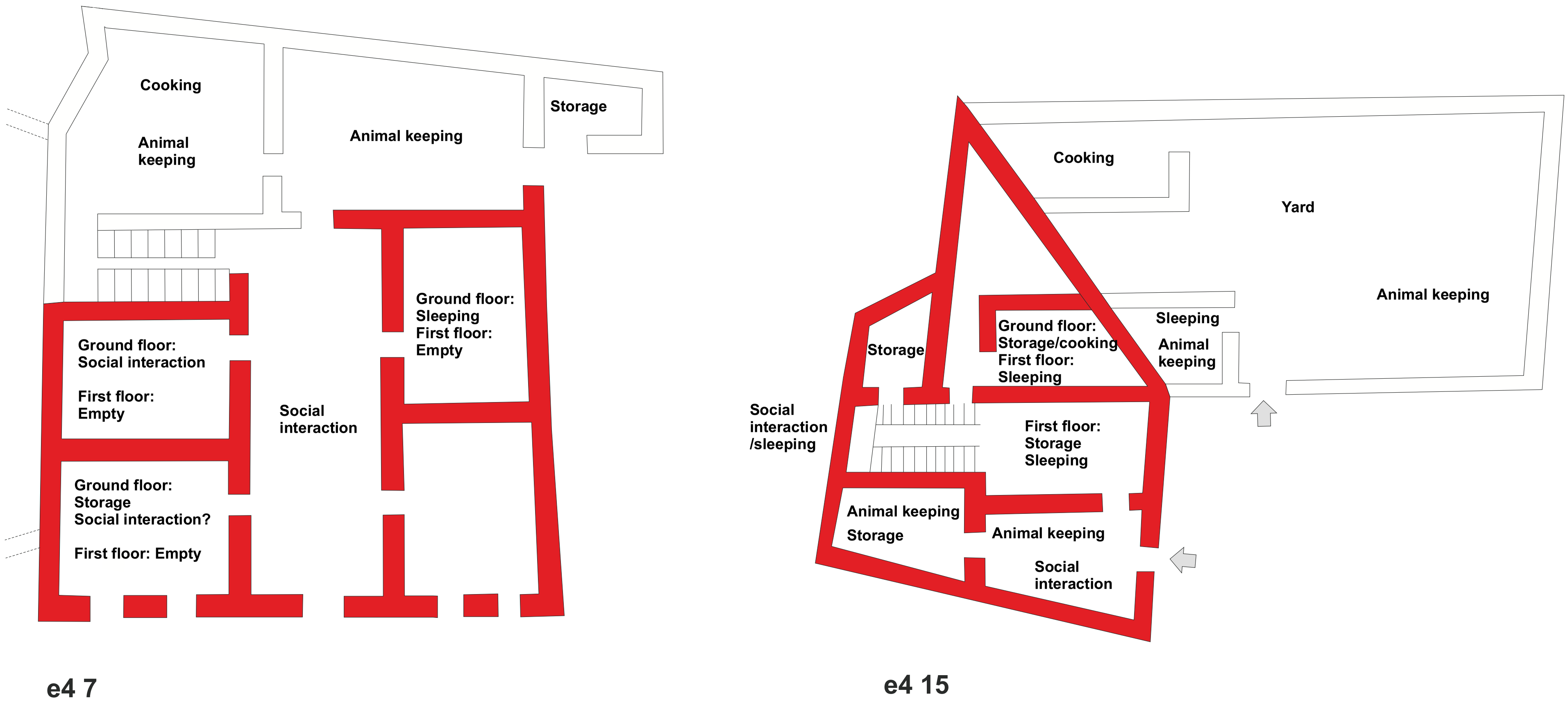
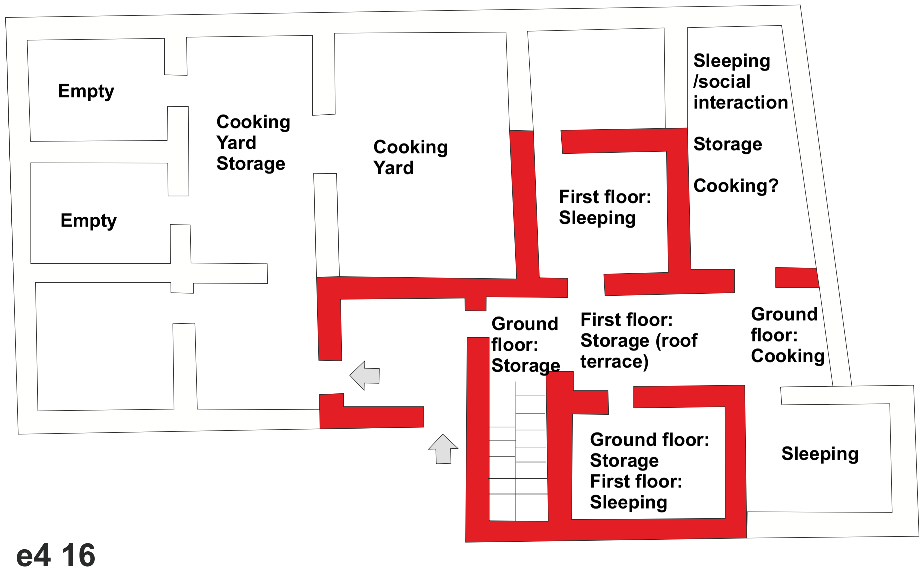


Fig. 3.47. Left: House e4 7, floor plan (showing first floor plan in red), Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) no scale provided, unknown North)
Right: House e4 15,floor plan (showing first floor plan in red), Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) no scale provided, unknown North)



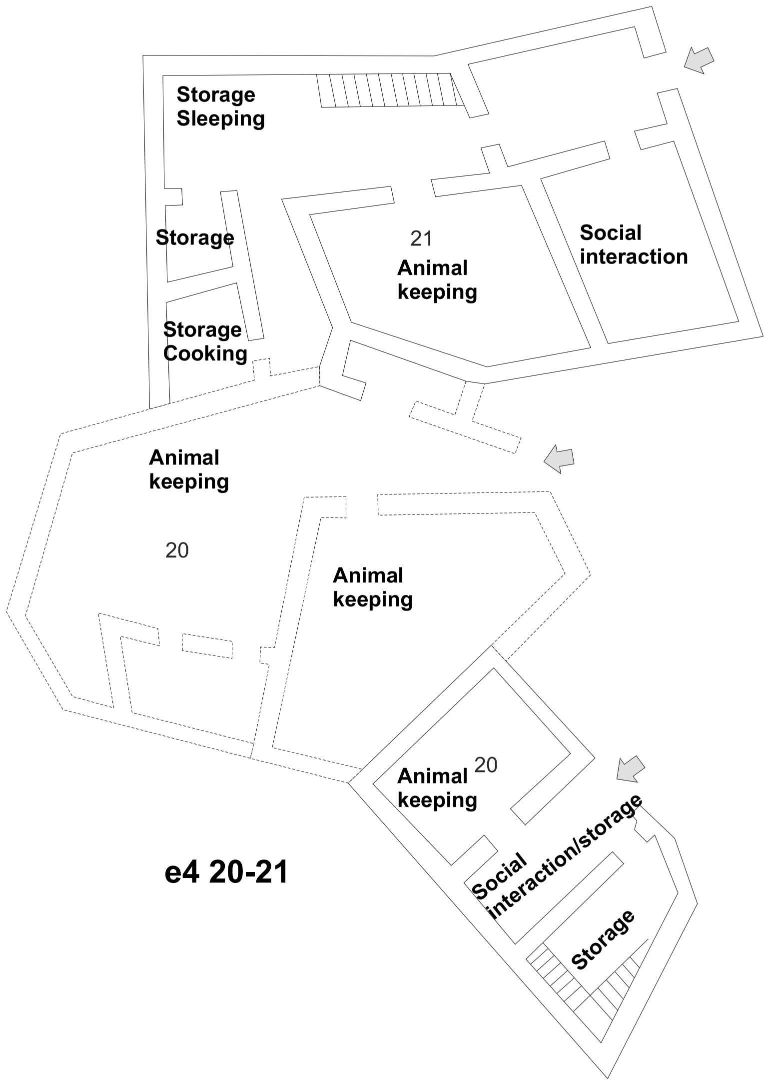
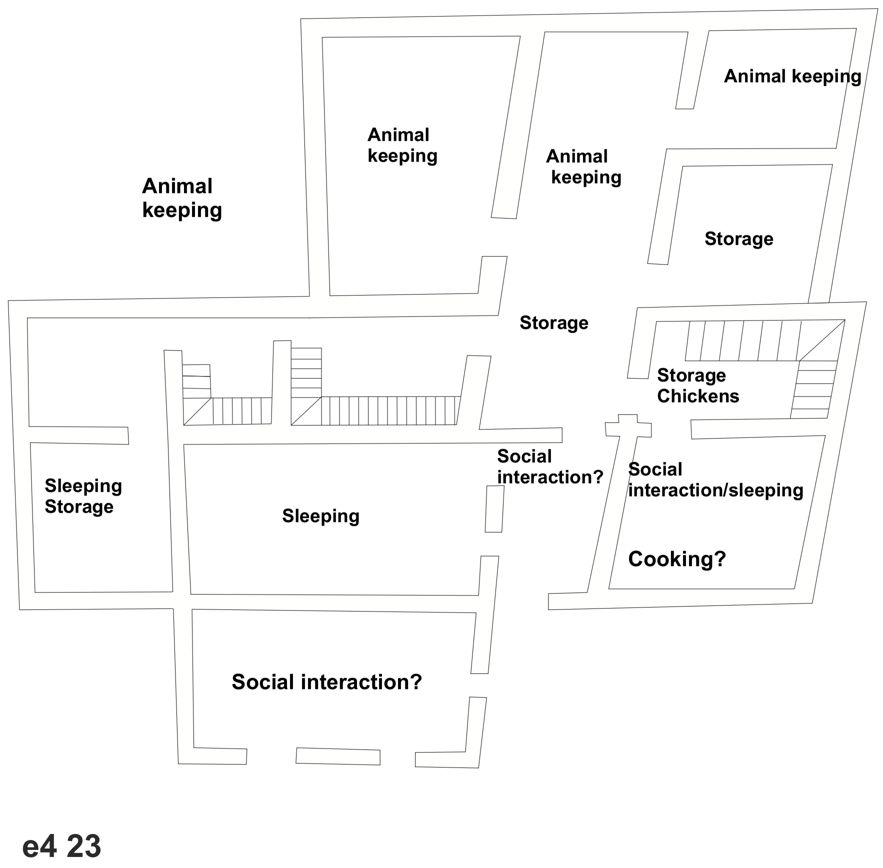
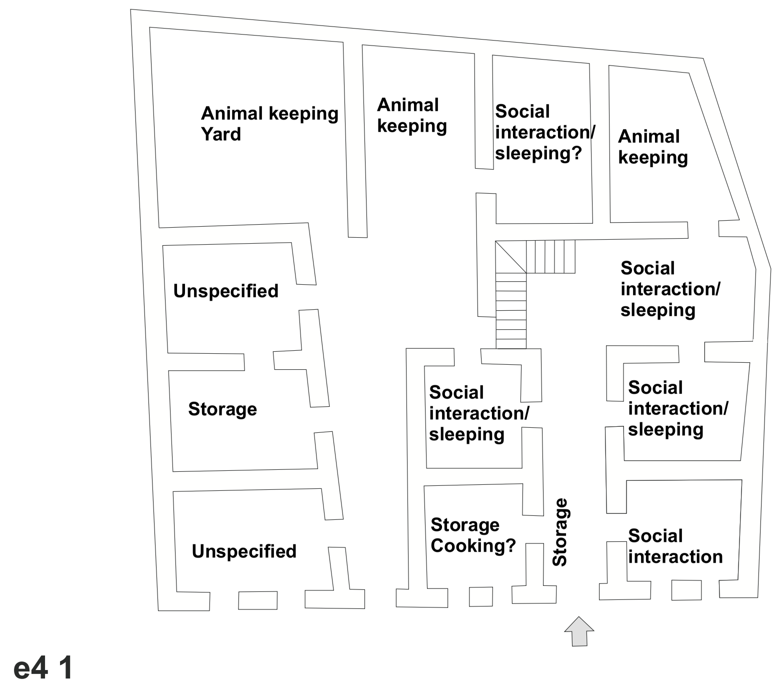


Fig 3.48. Left: House e4 16, floor plan (showing first floor plan in red), Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) (no scale provided, unknown North)
Right: House e4 20-21, floor plan, Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) (no scale provided, unknown North)





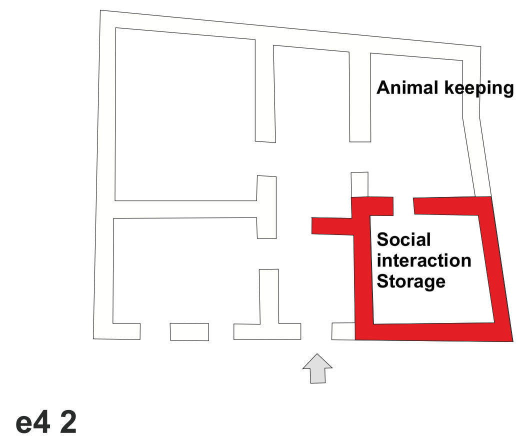


Fig 3.49.Top left: House e4 23, floor plan,Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) (no scale provided, unknown North)
Top right: House e4 1,floor plan, Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) (no scale provided, unknown North)
Bottom: House e4 2, floor plan (showing first floor plan in red),Old Qurna survey (Hassan Fathy collection, RBSCL - American University in Cairo) (no scale provided, unknown North)

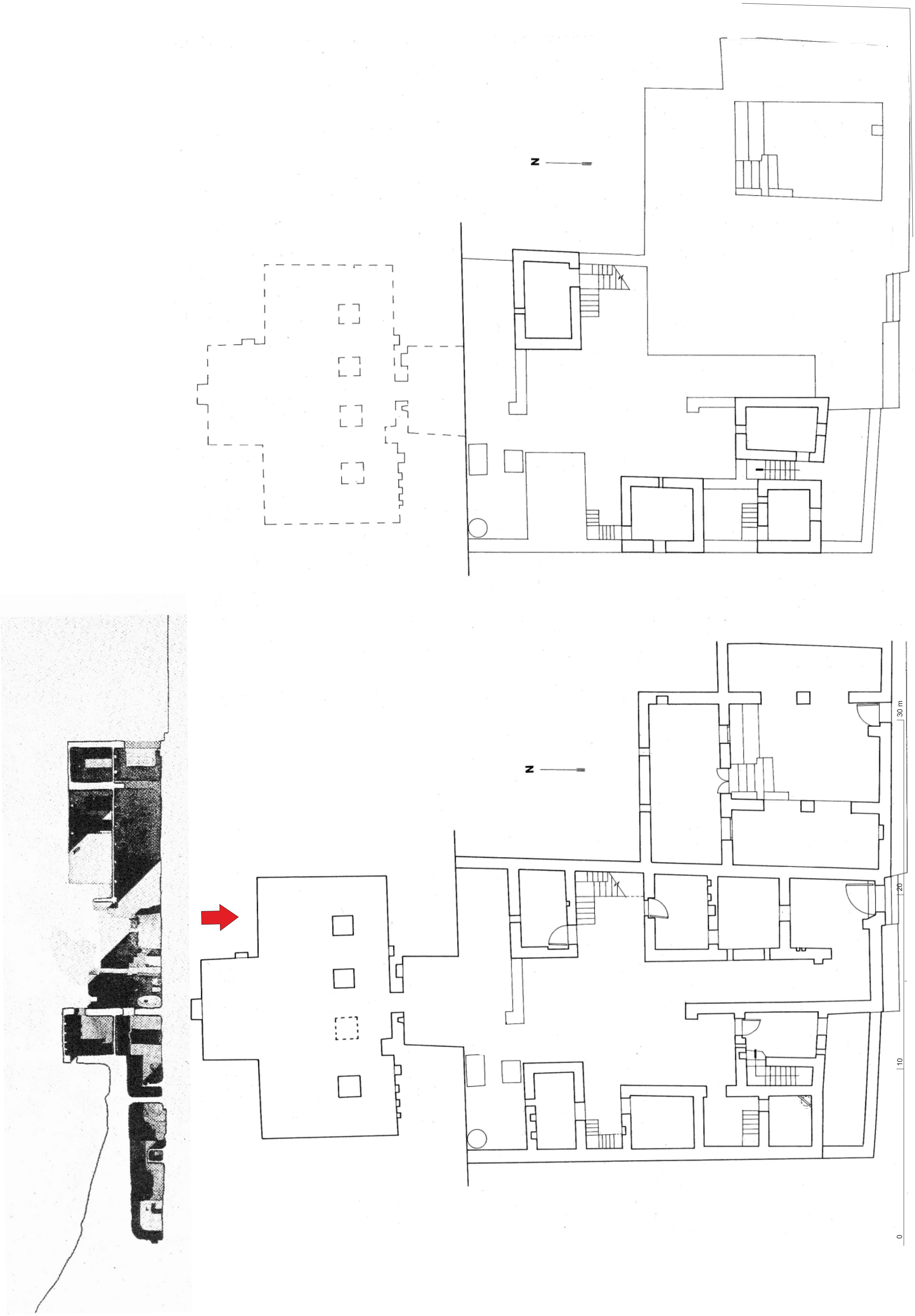


Fig. 3.50. Phase 1: Abd el Samad (1840),
Top: Crossl section
Left: ground floor (Castel 1984, 161)
Right: first floor (Castel 1984, 161)

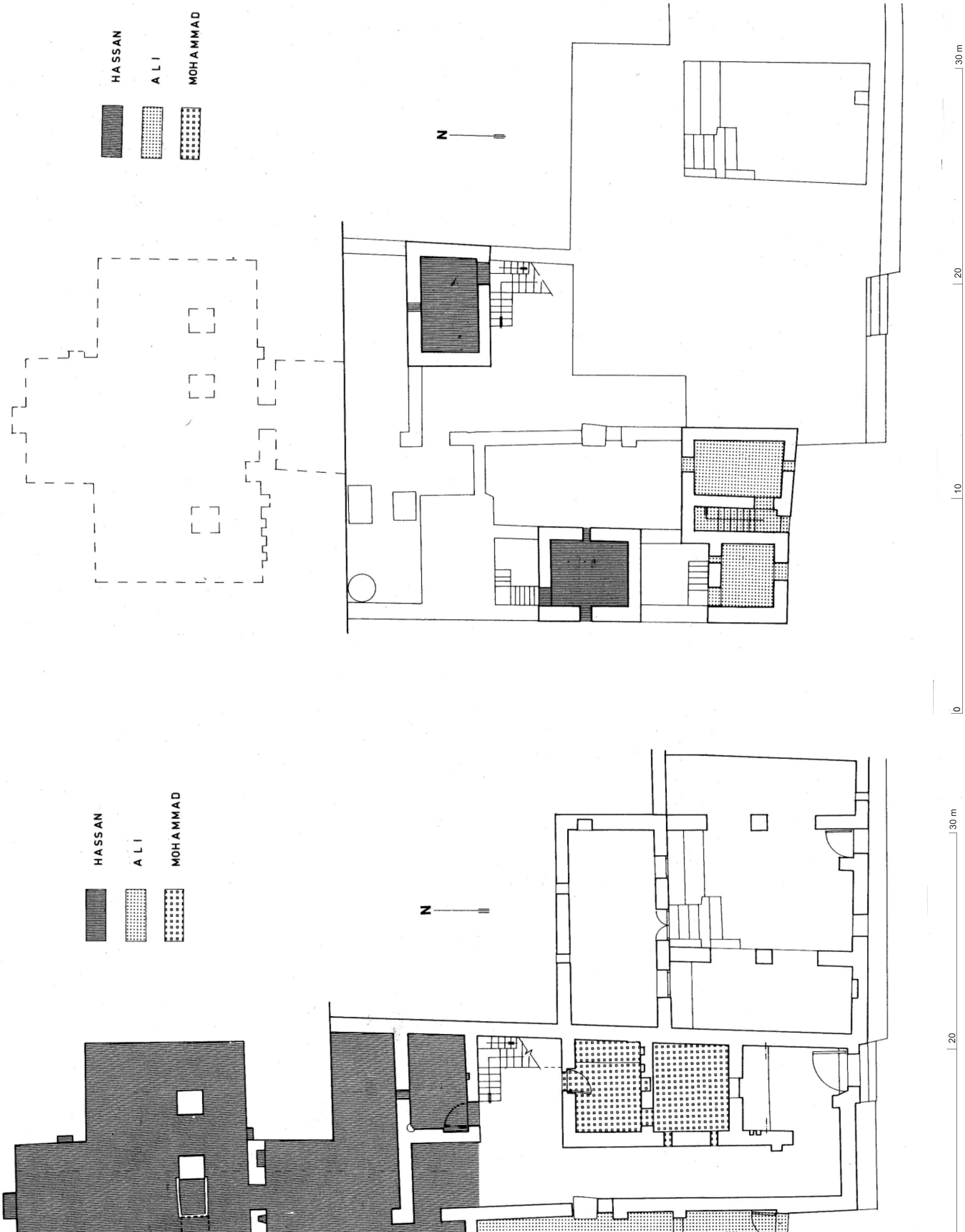


Fig. 3.51. Phase 2: Hassan, Ali, Mohammad, ground and first floor (1900) (Castel 1984, 163)

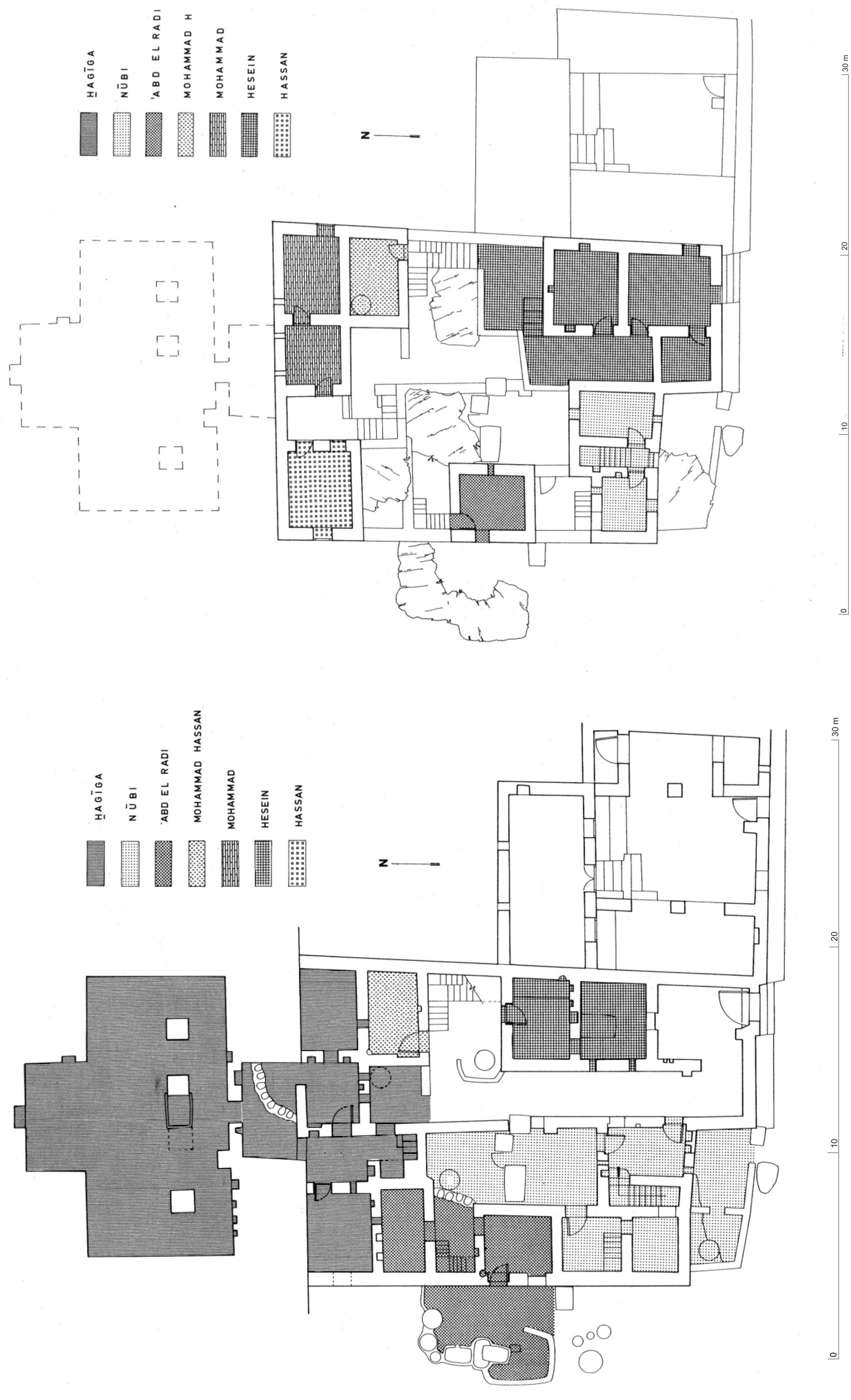


Fig. 3.52. Phase 3: ground and first floor (1971) (Castel 1984, 165)

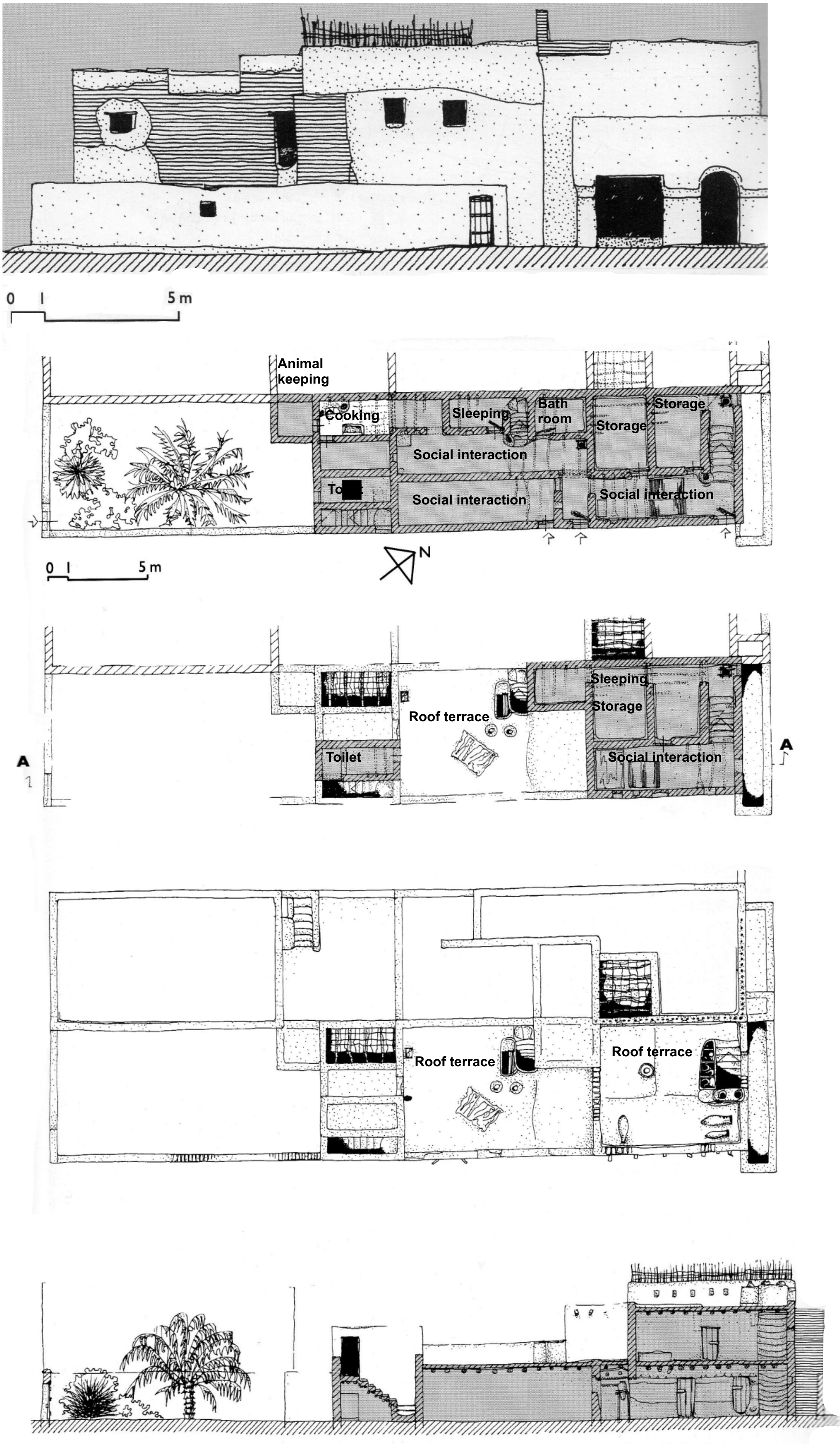


Fig. 3.53. House I, Bashendi. From top to bottom: Elevation of the north facade, ground, first and roof terrace plans and section A-A (Schjins 2008, 34-36).

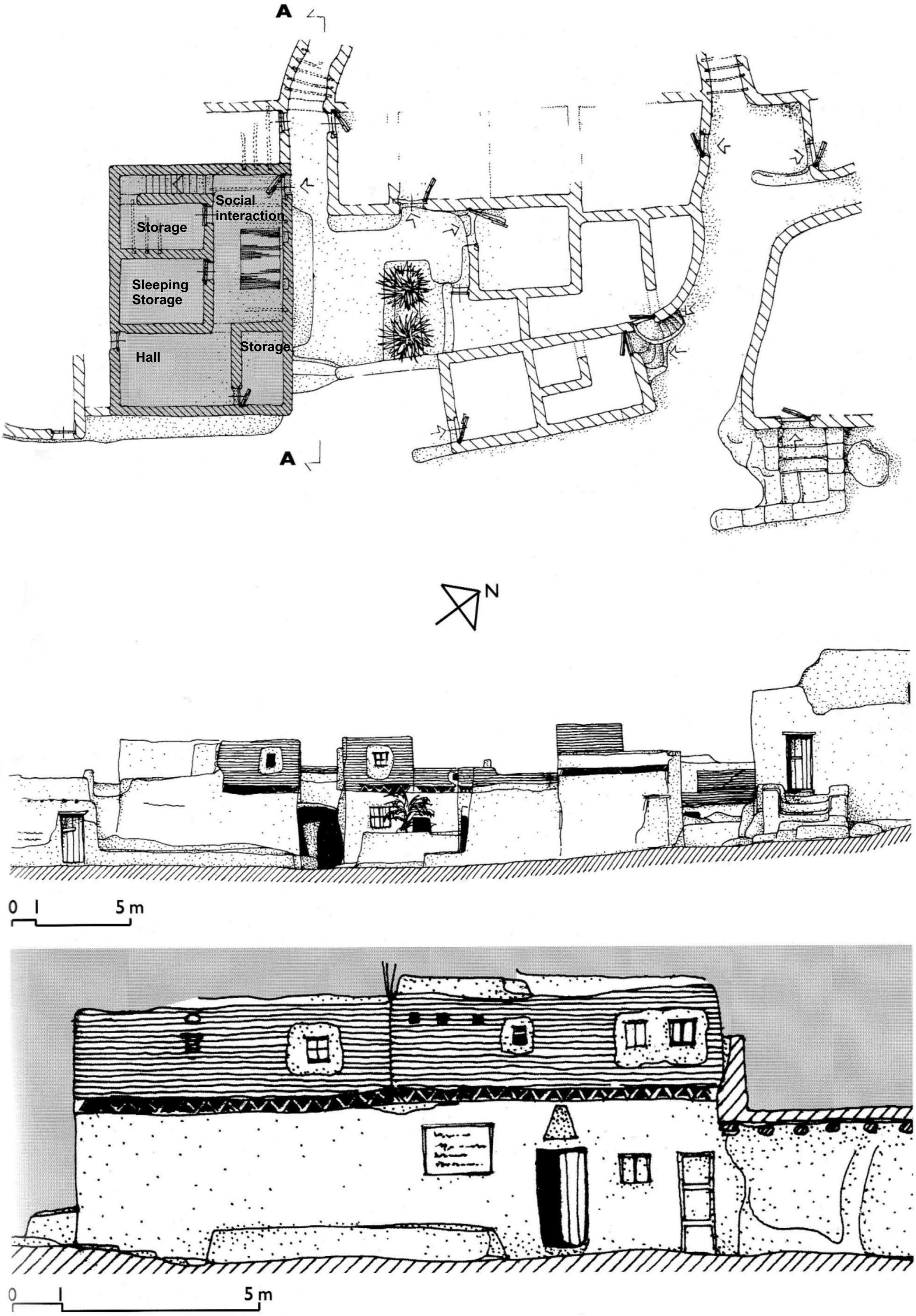


Fig. 3.54. House 2, Bashendi. From top to bottom: Plan of the ground floor, elevation of the south-east facade and north-east facade and north east facade (profile A-A) (Schjins 2008, 39).

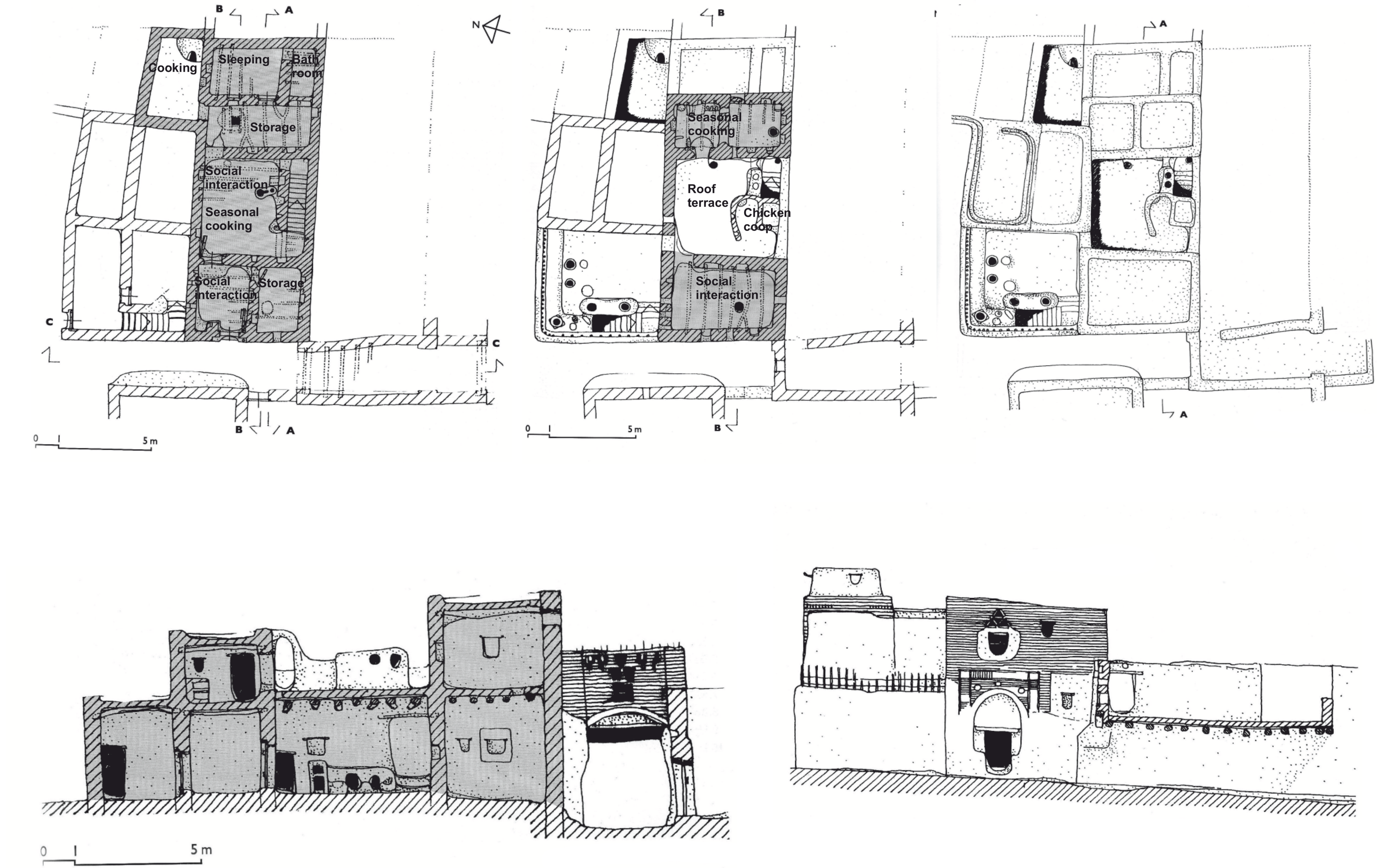


Fig. 3.55. House in Balat.
Top: ground and first floor and roof terrace plans.
Bottom: Elevation of the south-west facade (C-C) and section east-west (AA) (Schjins 2008, 43-45).

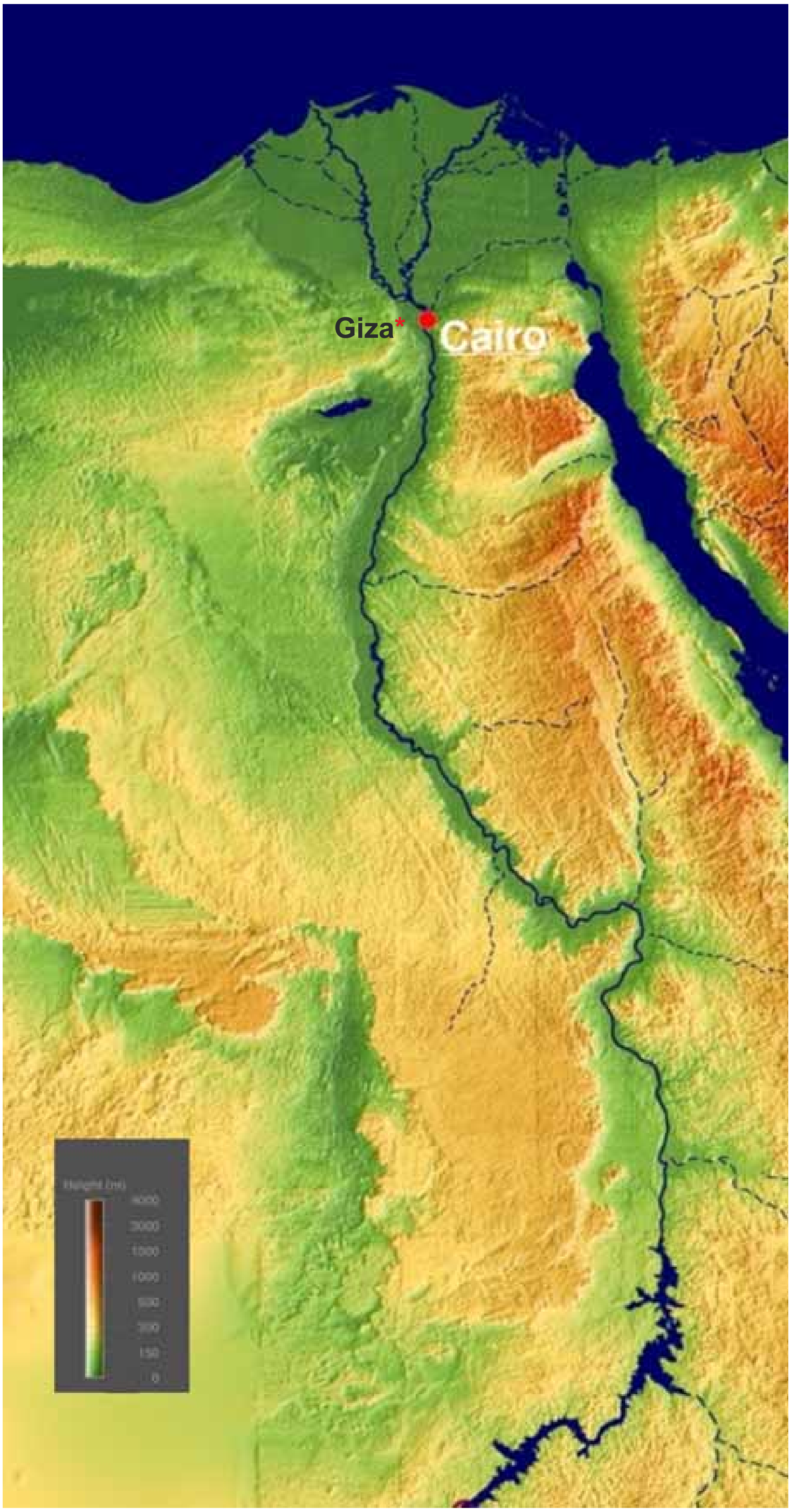


Fig. 4.1. Map showing selected Old Kingdom archaeological sites (original map: www.ginkgomaps.com)

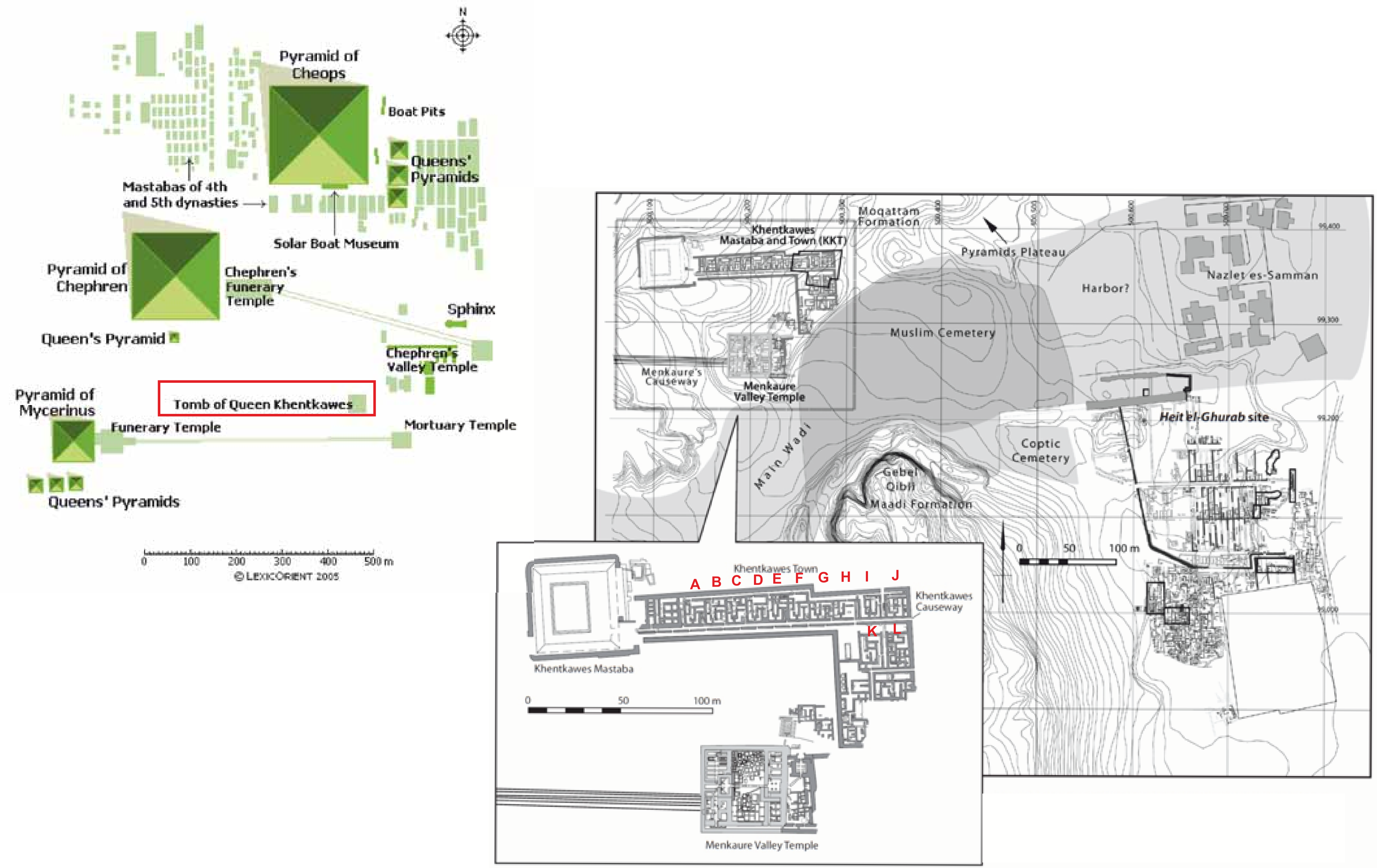


Fig. 4.2. Left: Map of Giza showing the position of the Khentkawes Town with respect to the three pyramids (© LexicOrient 2005, www.googlesightseeing.com)
Right: The southeastern part of the Giza site, showing the Khentkawes Town at the top (Lehner et al 2009, 6)

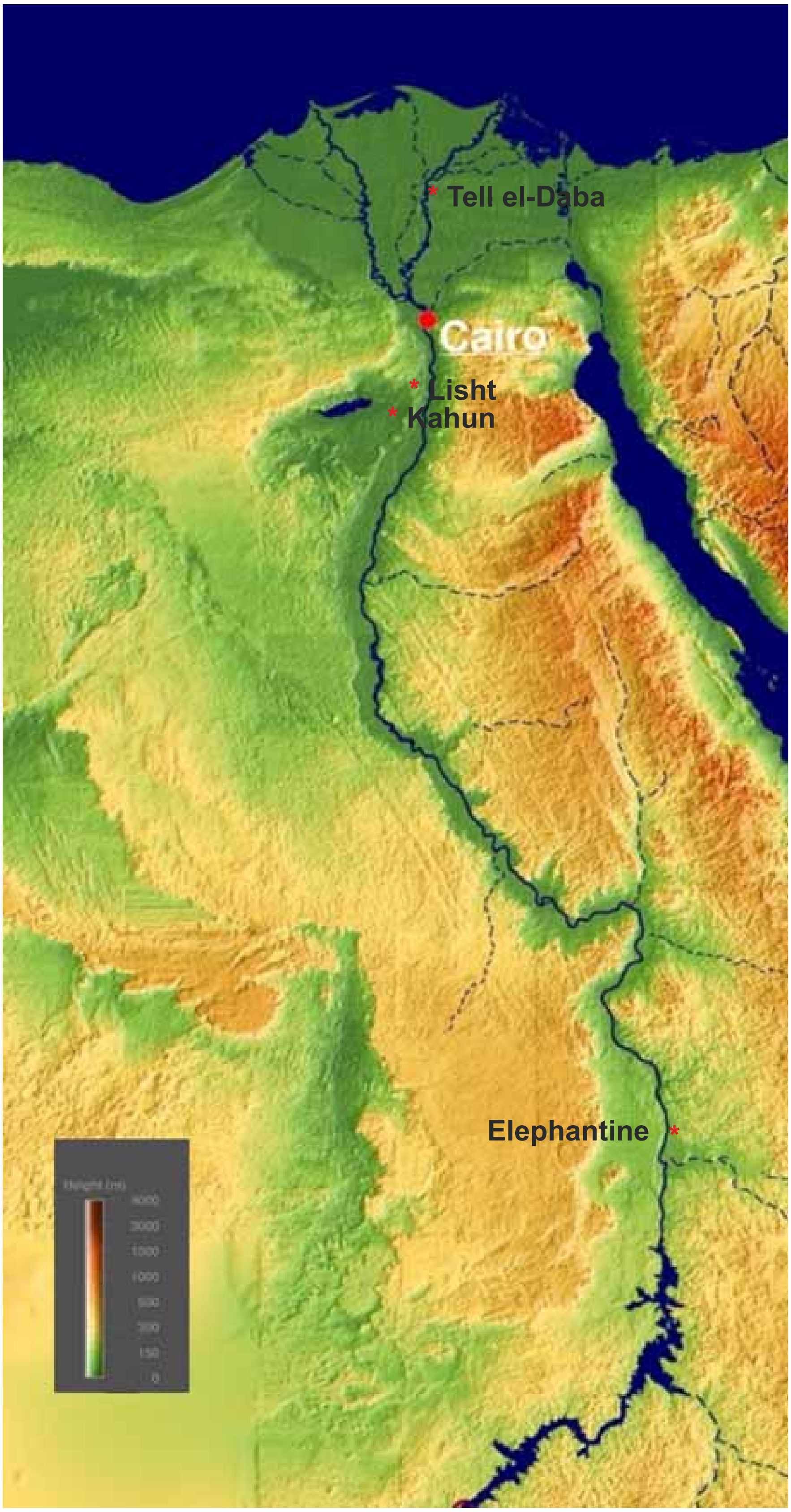


Fig. 4.3. Map showing selected Middle Kingdom archaeological sites (original map: www.ginkgomaps.com)

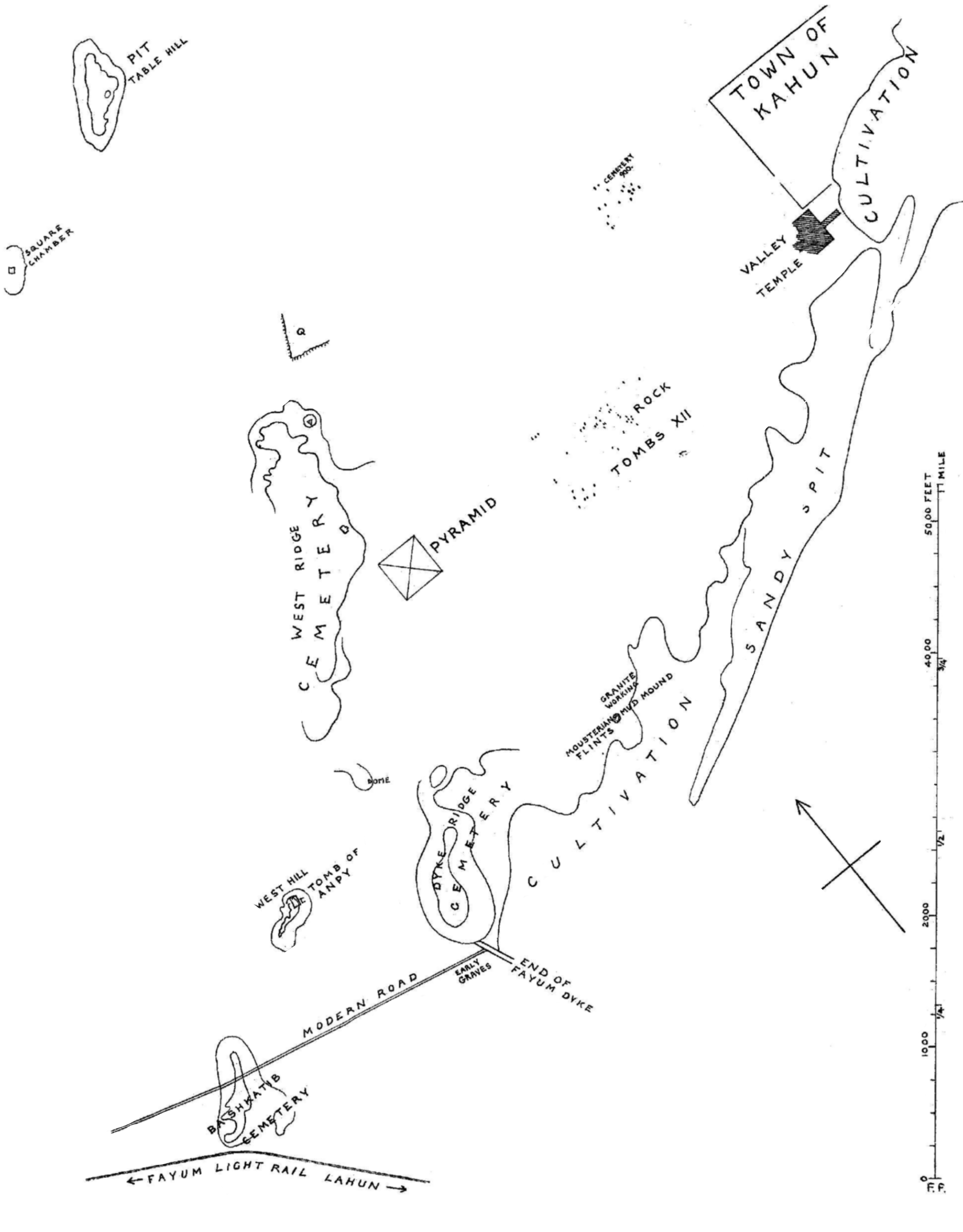


Fig. 4.4. General map of the Kahun area (Petrie et al 1923, pl. II)

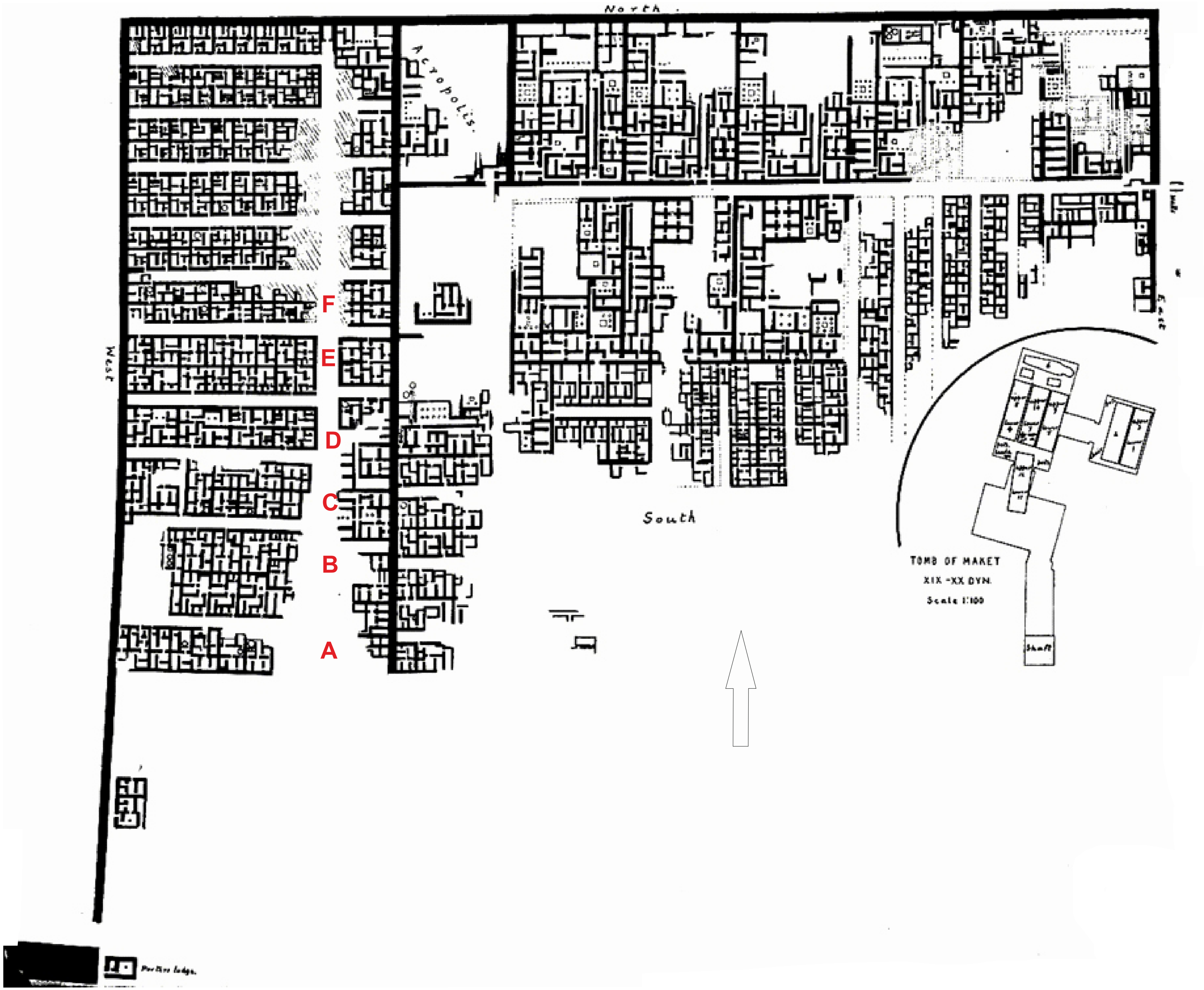


Fig. 4.5. The Kahun town (1:1500) (Petrie 1890, pl. XIV). The rank letters in red were given by Petrie but not included in the original drawing.

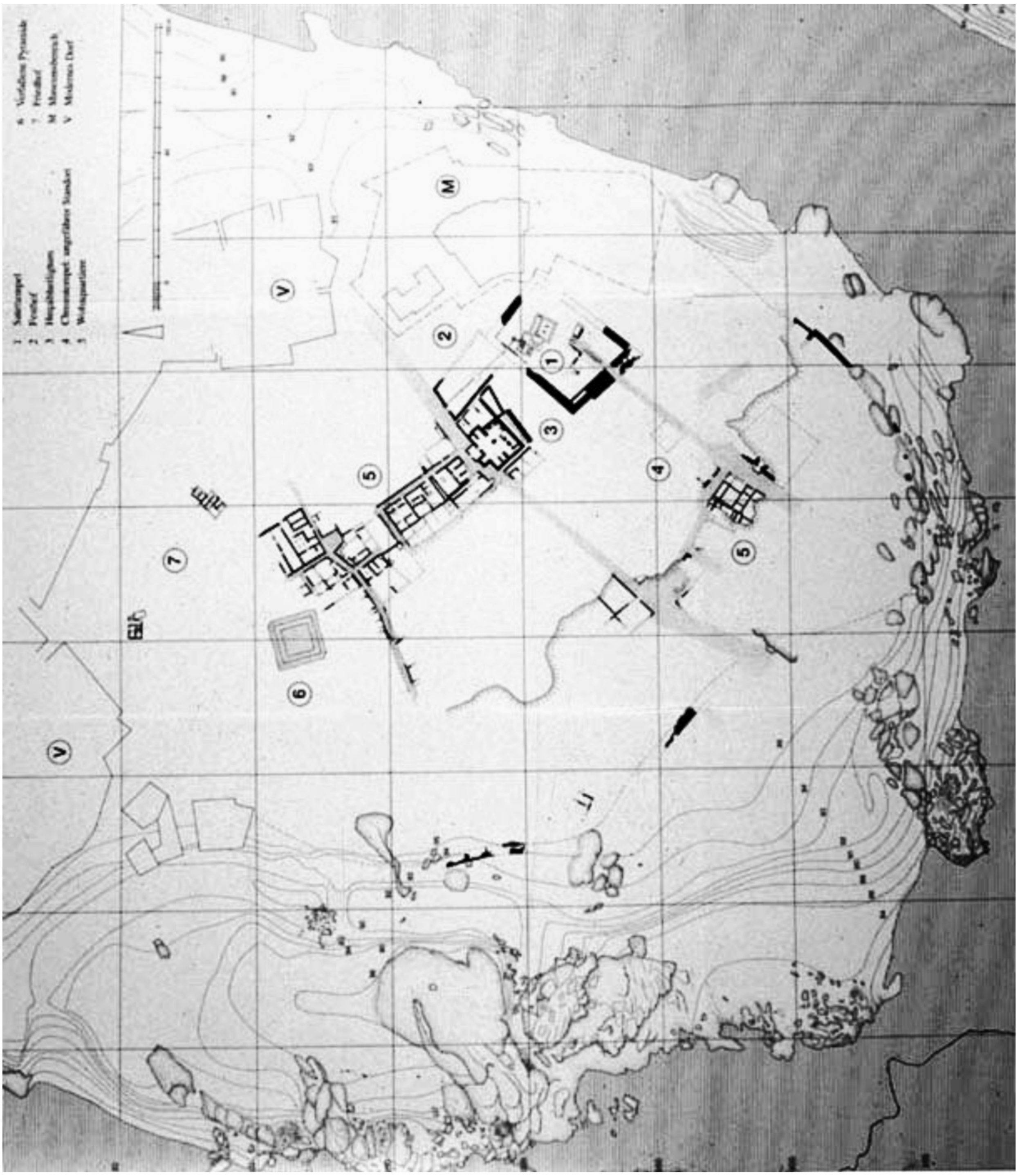


Fig. 4.6. Map of Elephantine in the Middle Kingdom (/www.dainst.org) http://www.dainst.org/ar/project/3-%D8%A5%D9%84%D9%8A%D8%A7%D9%86%D8%AA%D9%8A%D9%86?ft=all

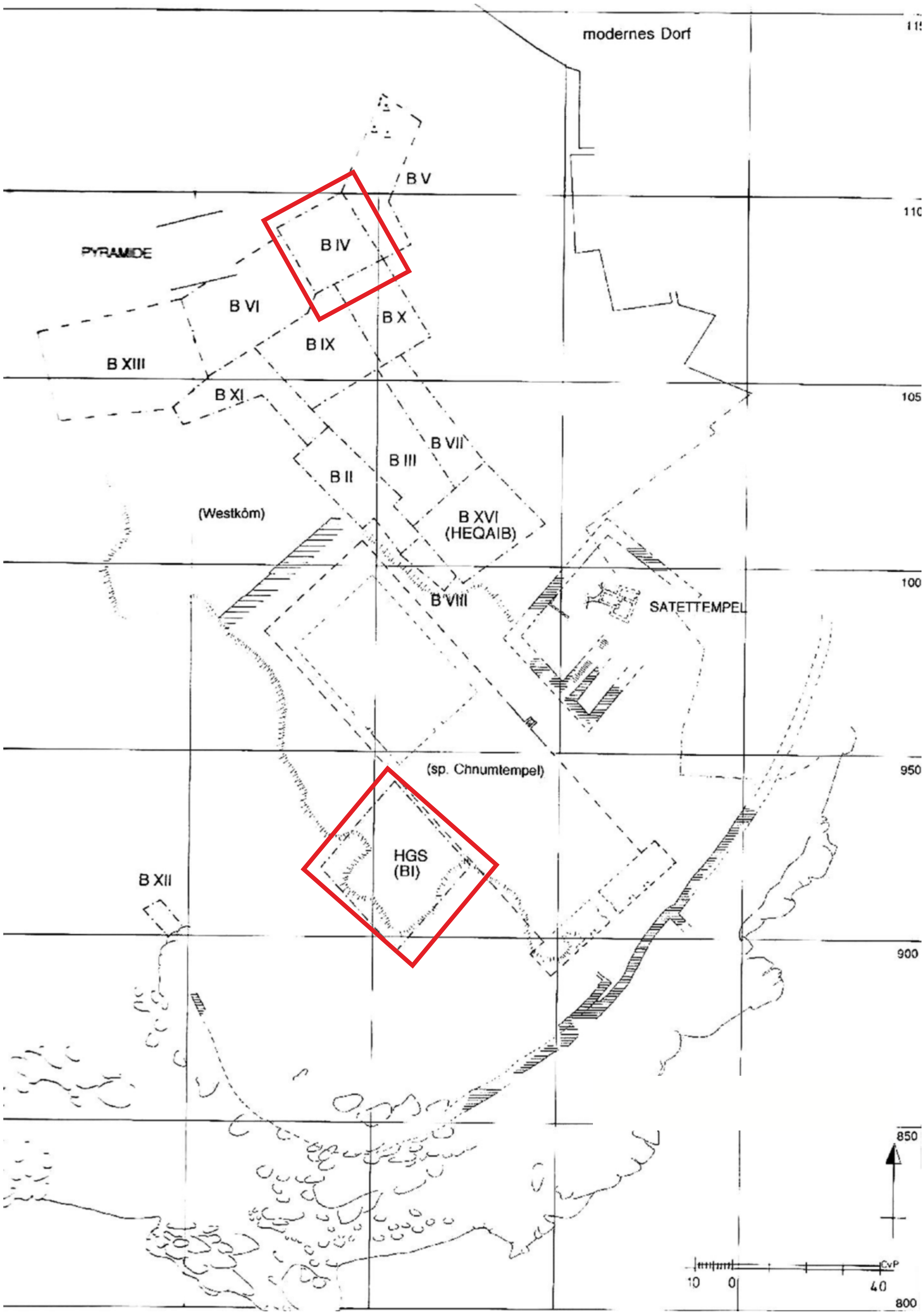
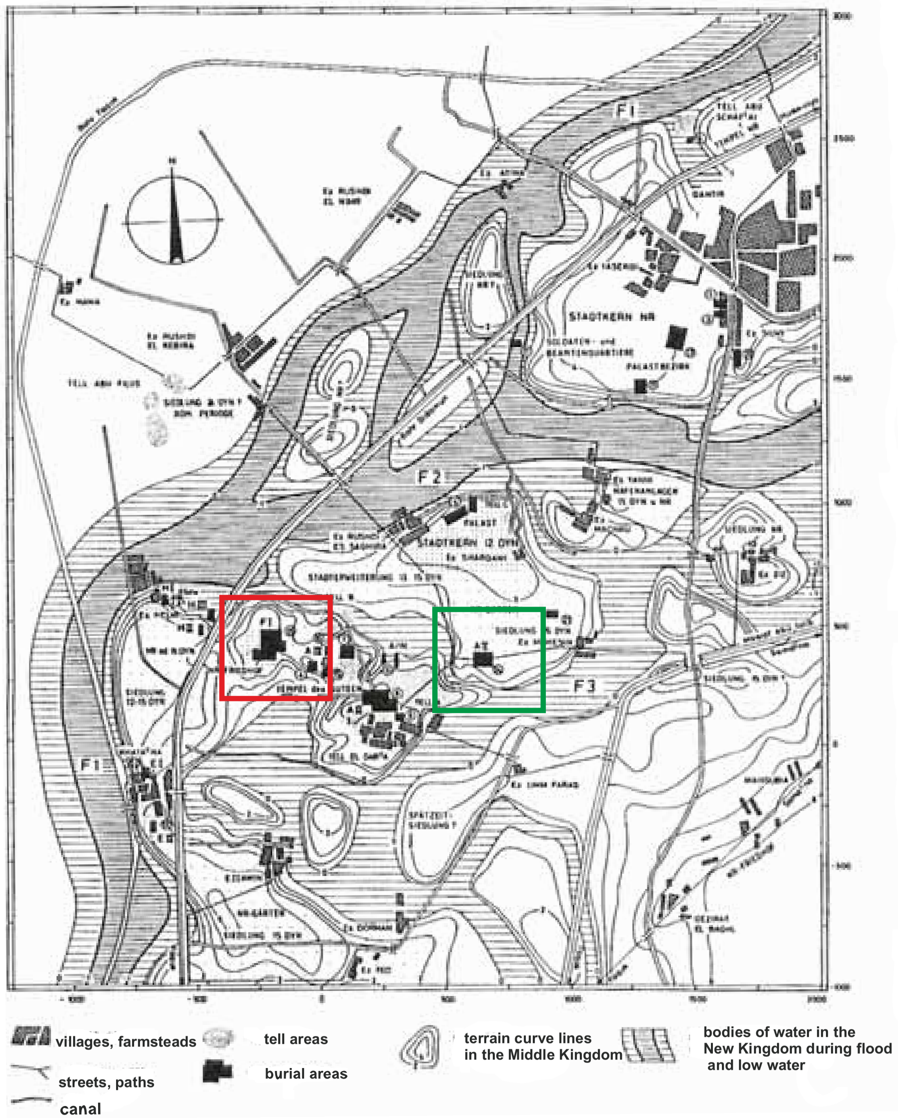


Fig. 4.7. Map of Elephantine in the Middle Kingdom with sample house areas highlighted (von Pilgrim 1996, 17)



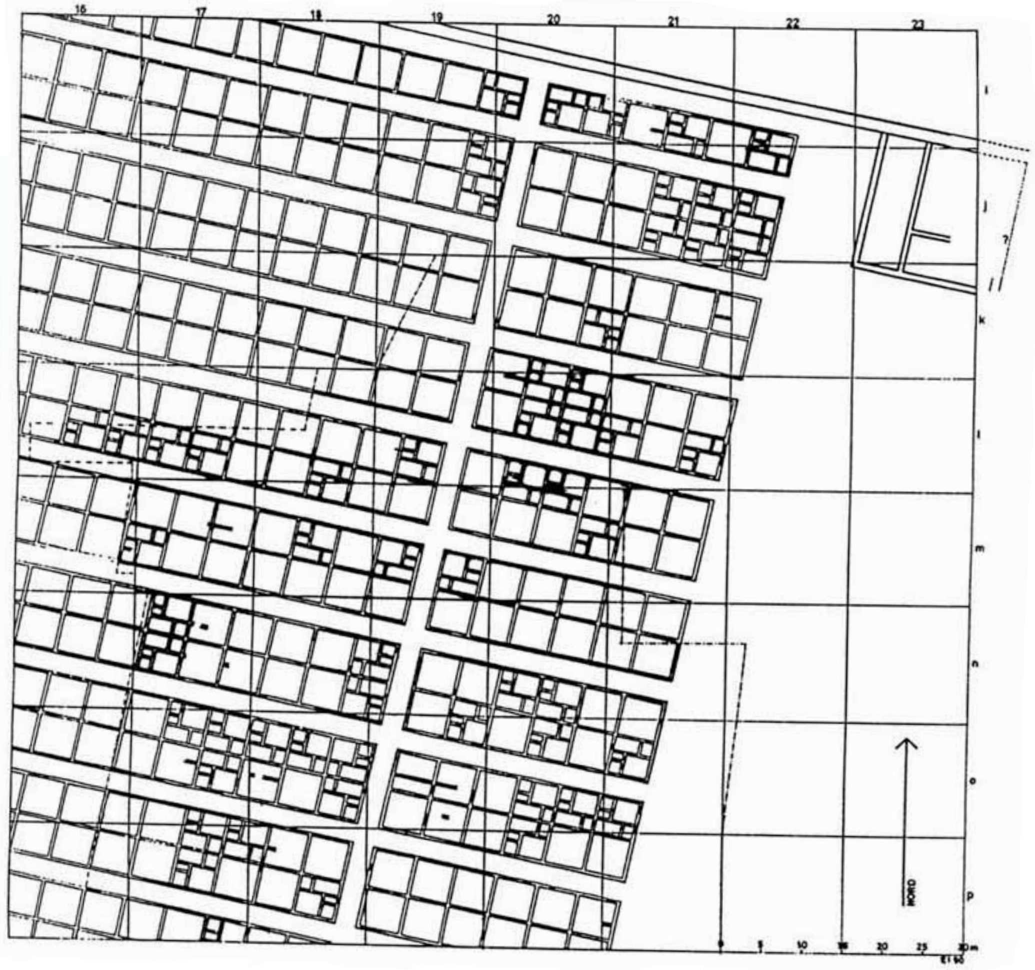


Fig. 4.8. Left: General plan of the site of Tell el-Daba with areas F/I (Middle Kingdom) and A/V (Second Intermediate Period) highlighted in red and green respectively (Czerny 1999).
Right: plan of F/I settlement (http://www.auaris.at/html/stratum_e_en.html)

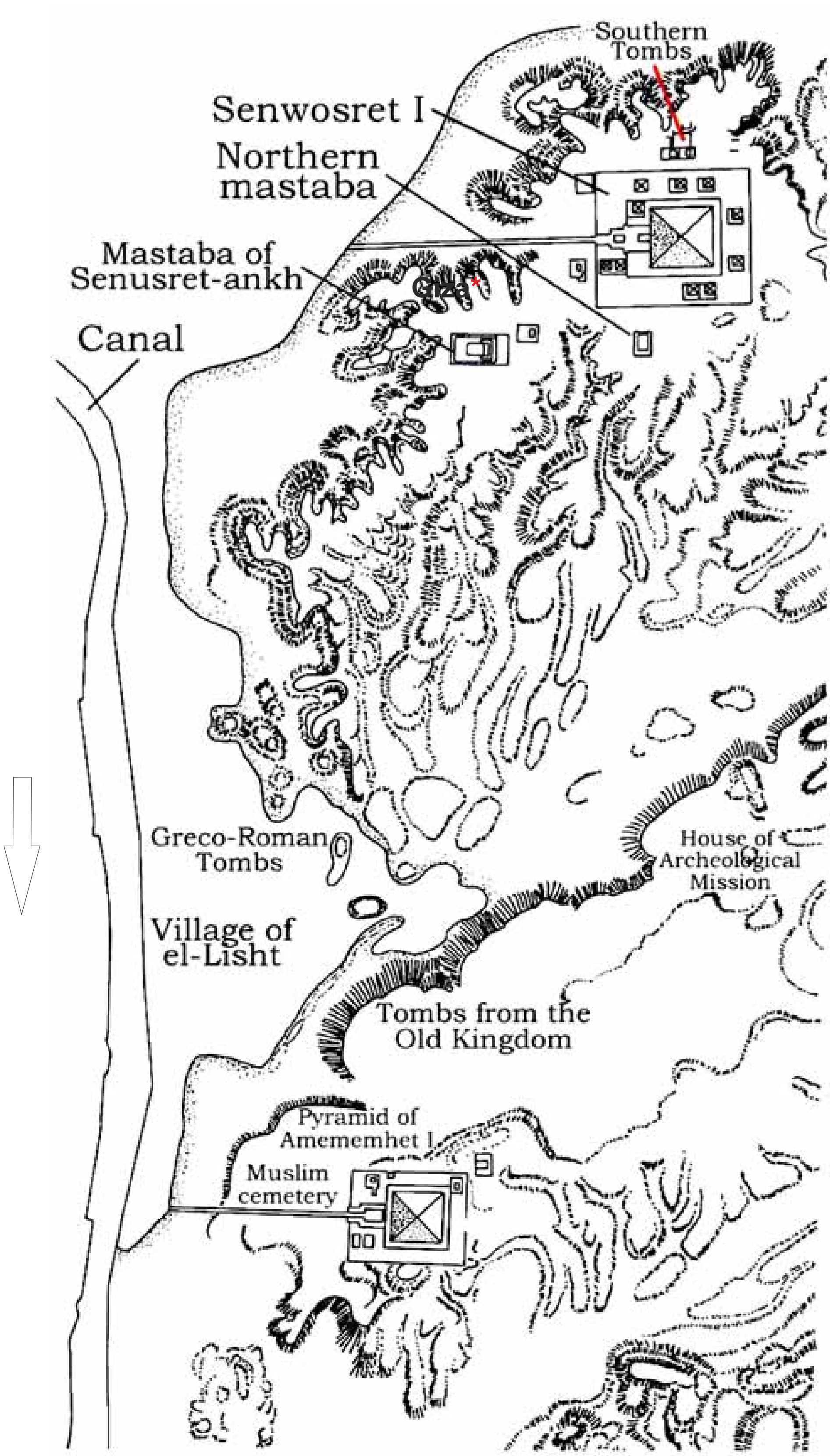


Fig. 4.9. Map of Lisht (http://egyptphoto.ncf.ca/el-Lisht.htm)

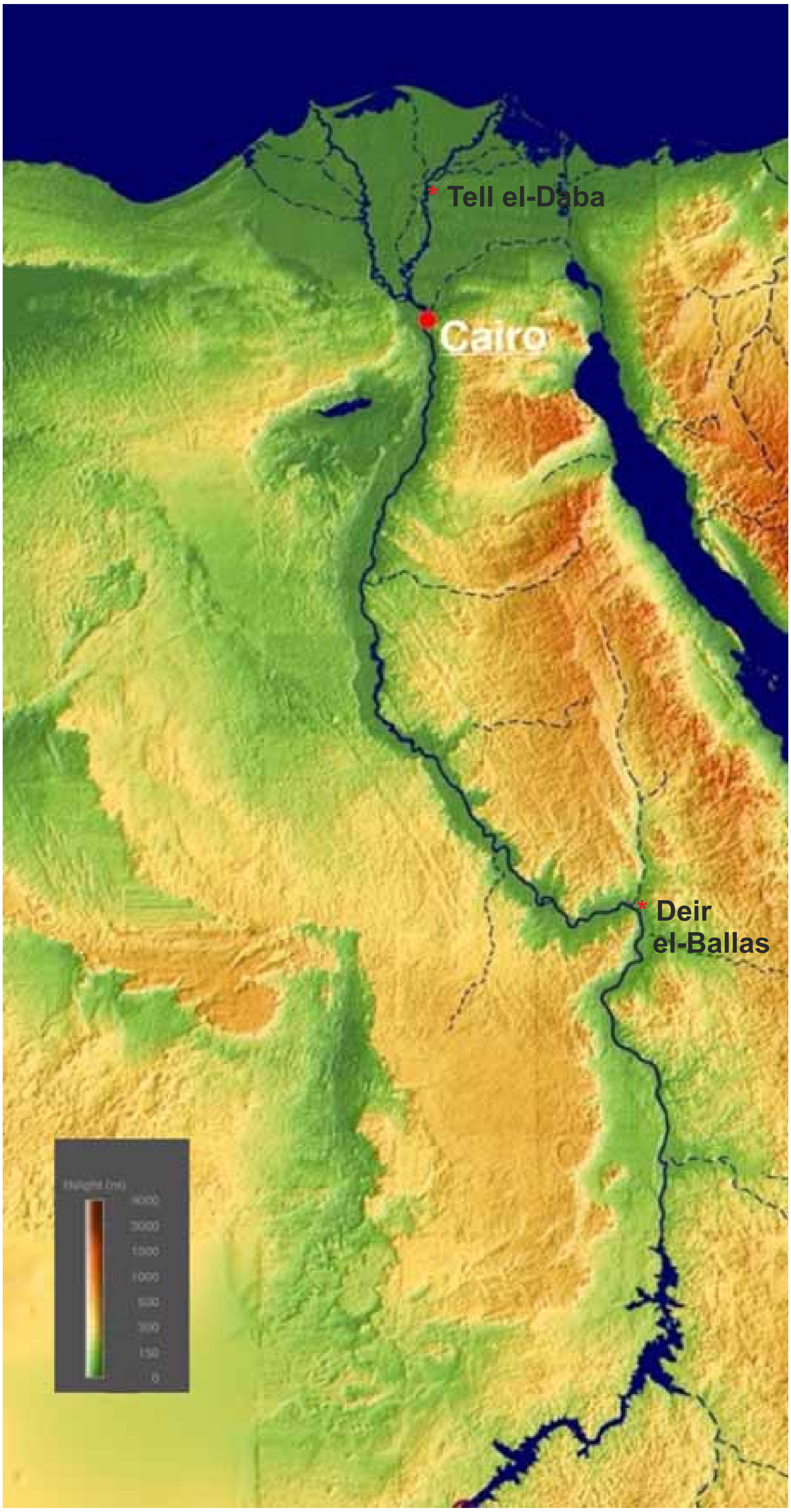
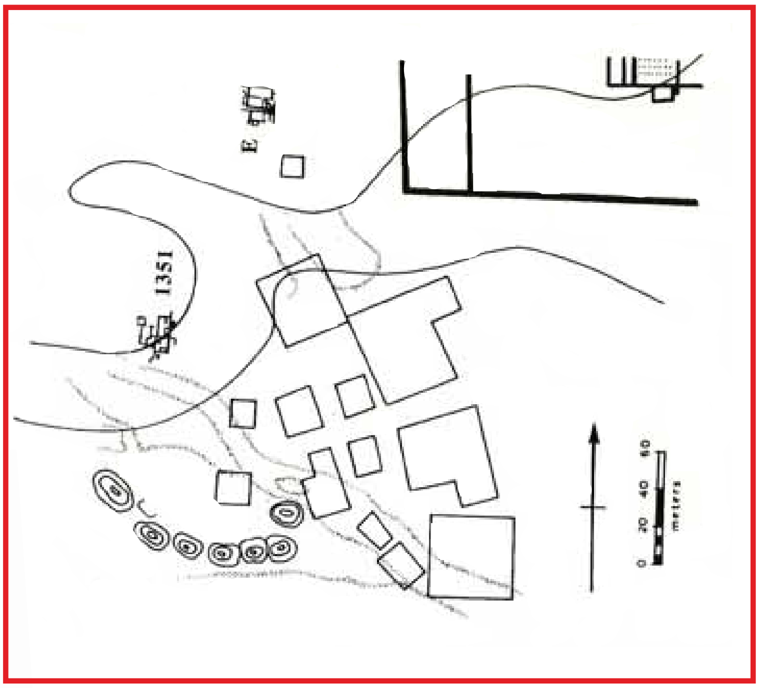


Fig. 4.10.Map showing selected Second Intermediate Period archaeological sites (original map: www.ginkgomaps.com)



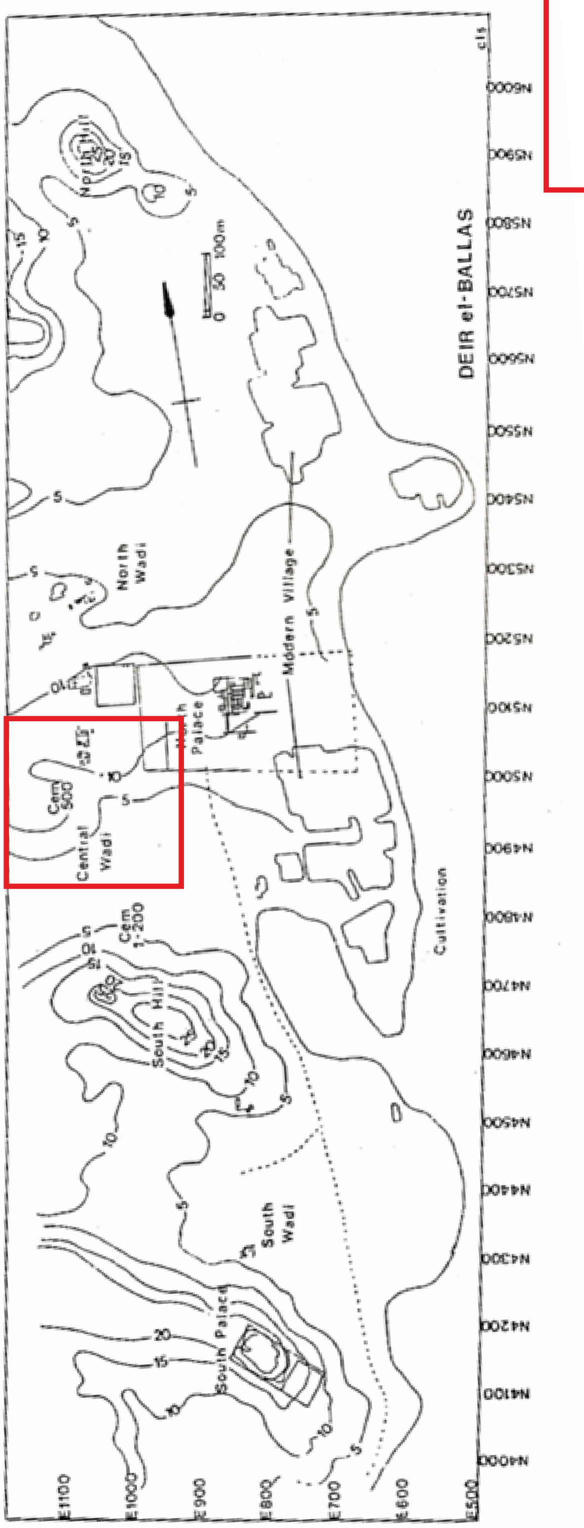


Fig. 4.11. Map of the Deir el-Ballas site and area around house E (Lacovara 1997, 94, 104)

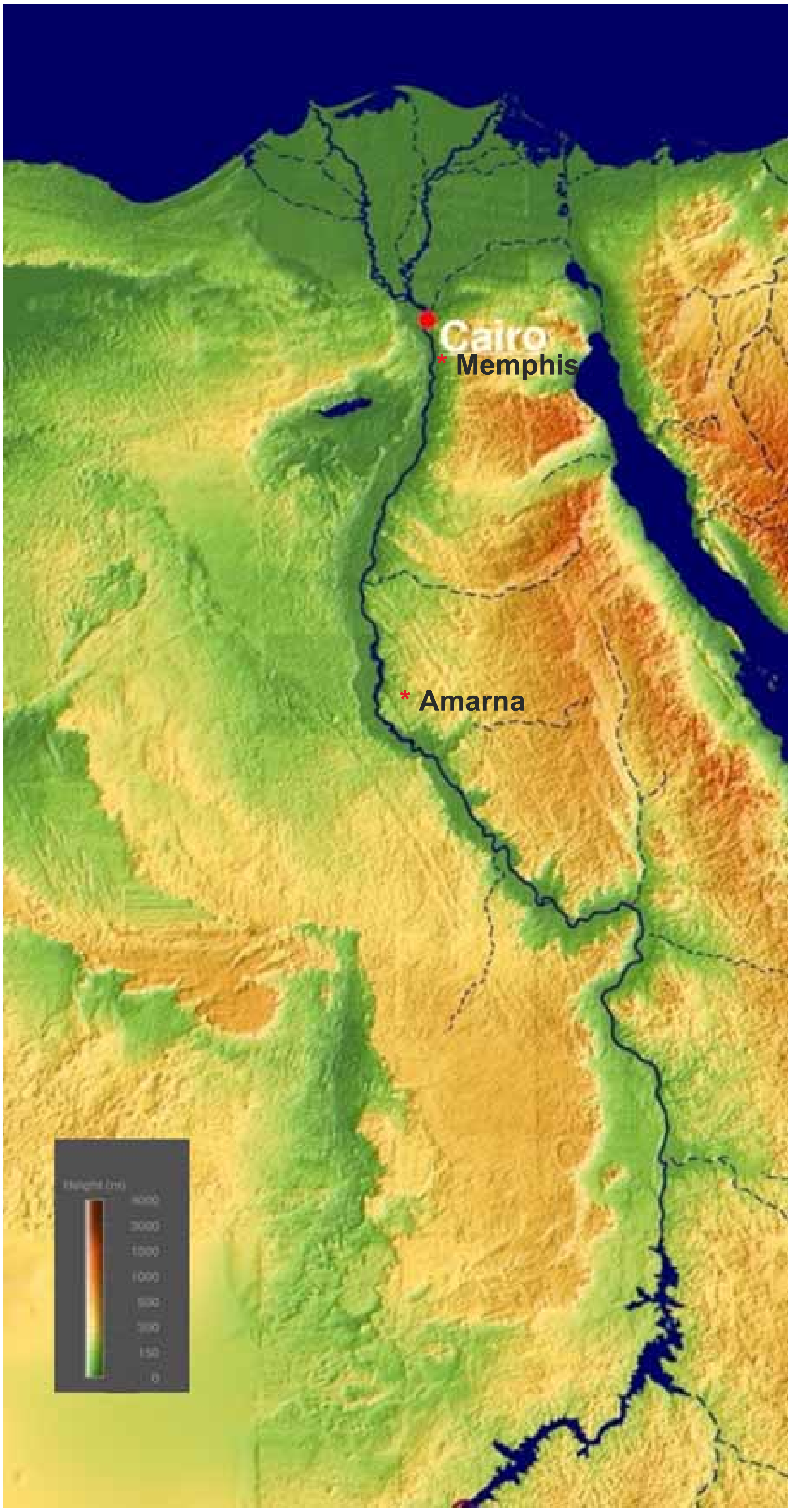


Fig. 4.12. Map showing selected New Kingdom archaeological sites (original map: www.ginkgomaps.com)

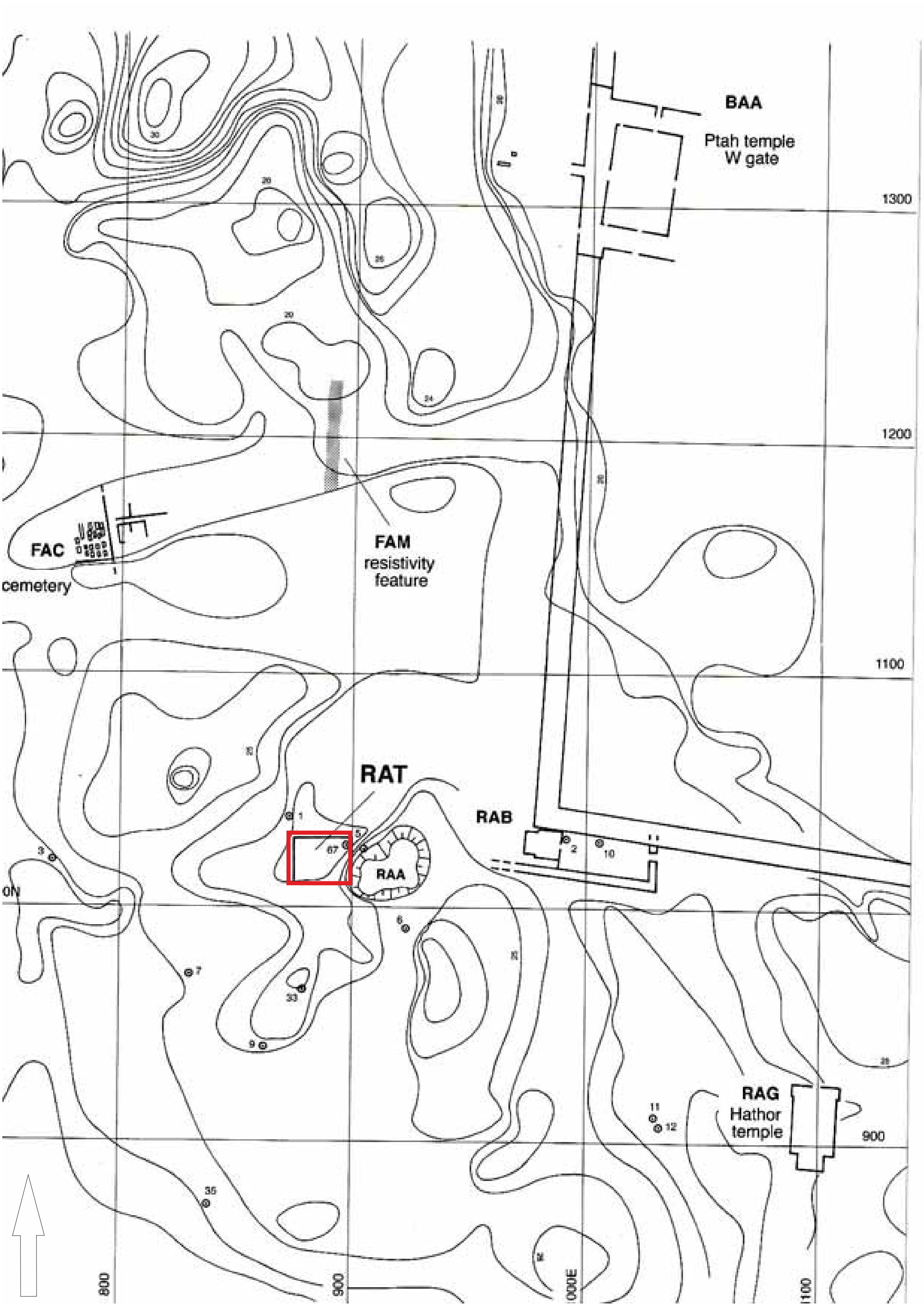


Fig. 4.13. Map of Kom Rabia showing RAT location (Jeffreys 2006, 37)

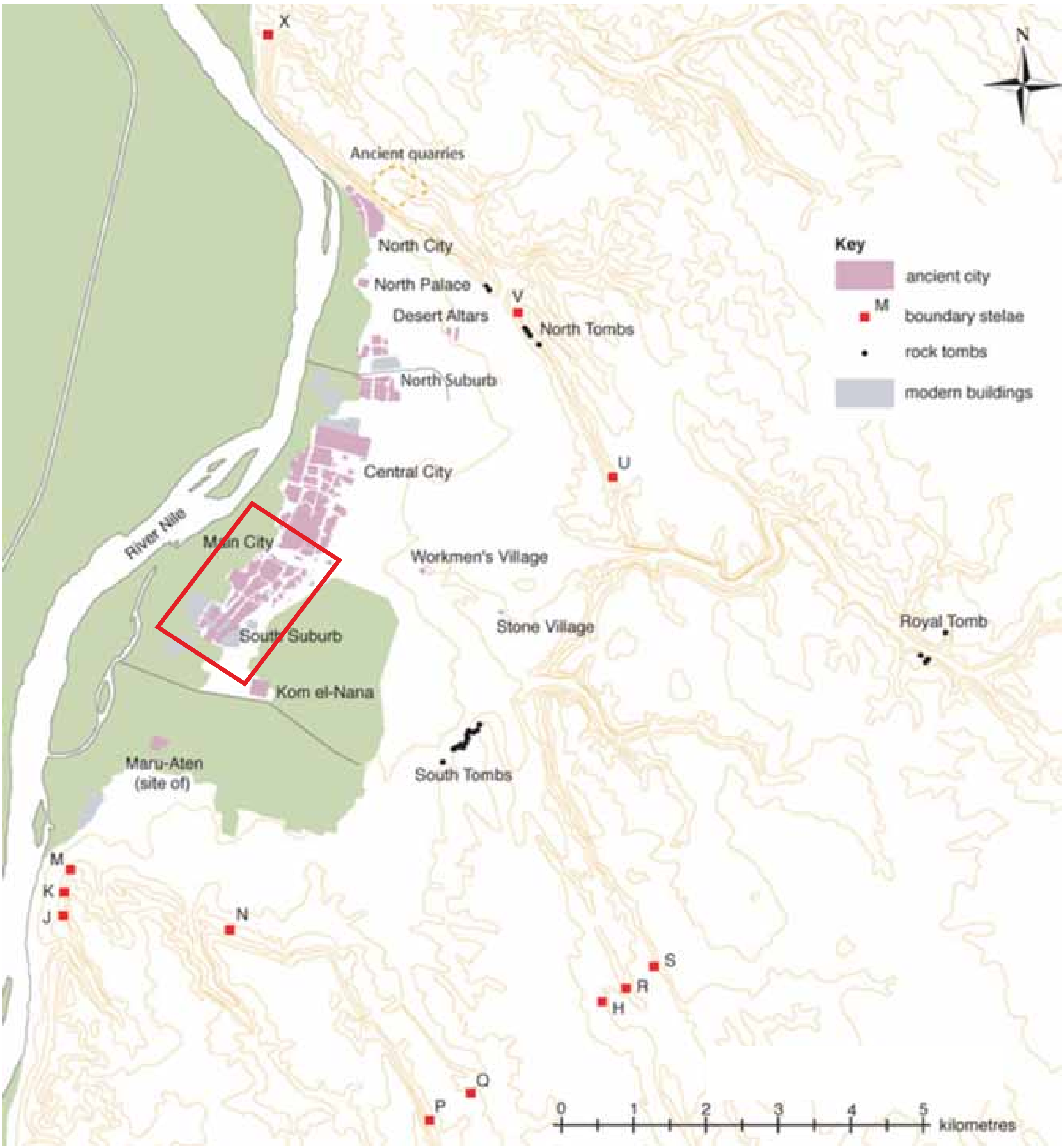


Fig. 4.14. General map of Amarna showing location of the Main City (http://www.amarnaproject.com/pages/amarna_the_place/index.shtml)

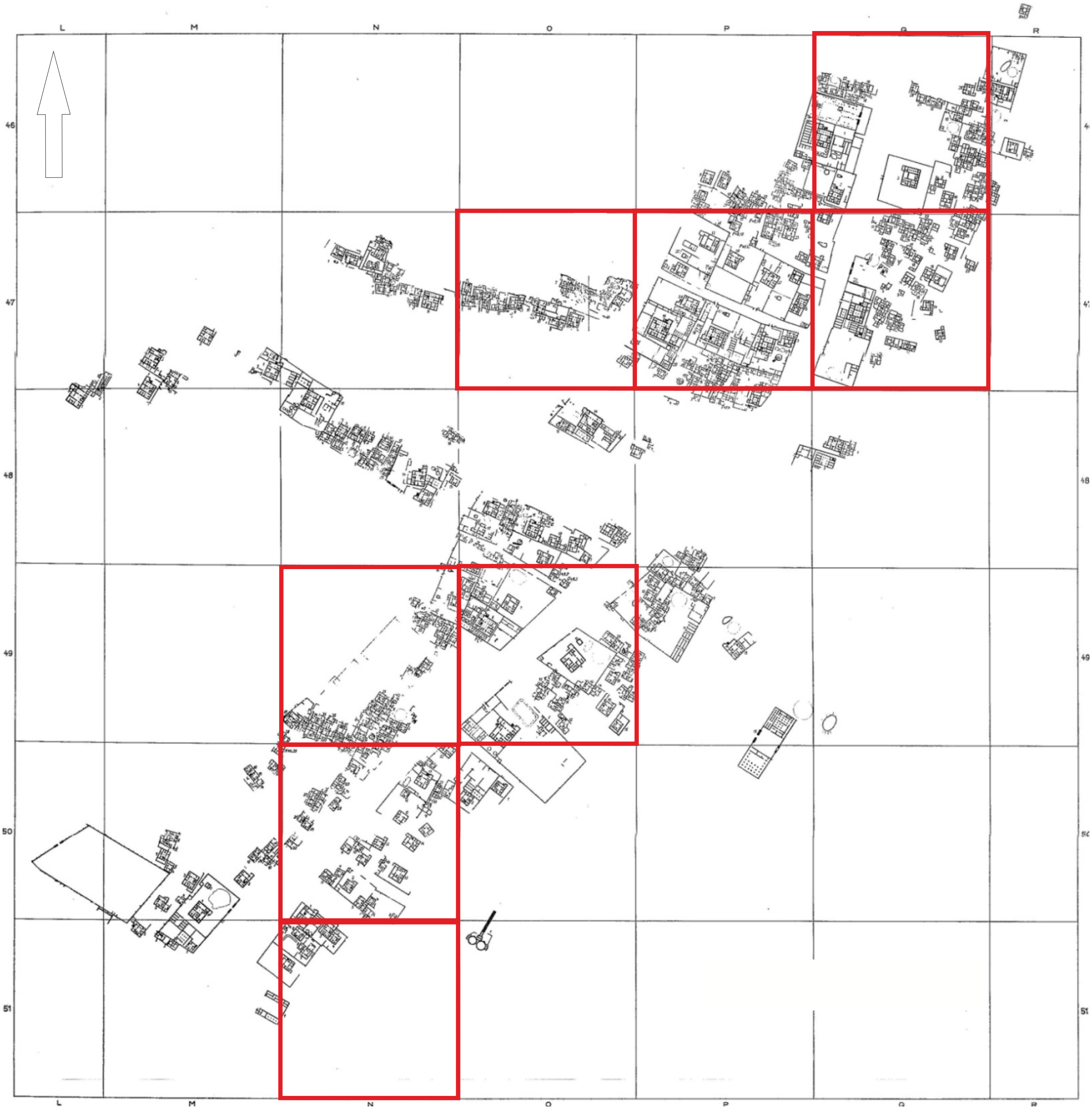


Fig. 4.15. Map of the Amarna Main City (the red squares show areas with houses included in the study (Borchardt and Ricke 1980, plan B))

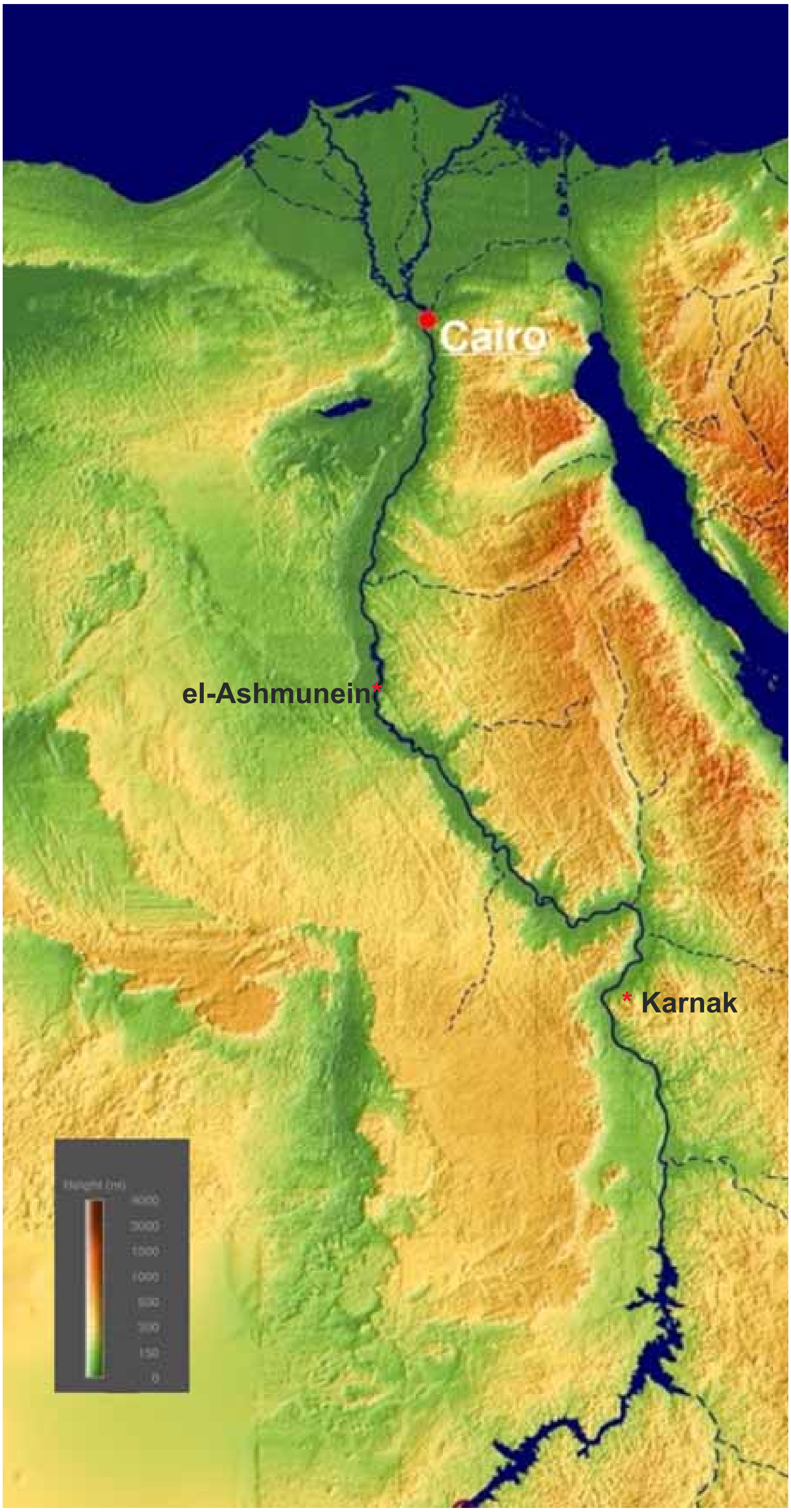


Fig. 4.16.Map showing selected Third Intermediate Period archaeological sites (original map: www.ginkgomaps.com)

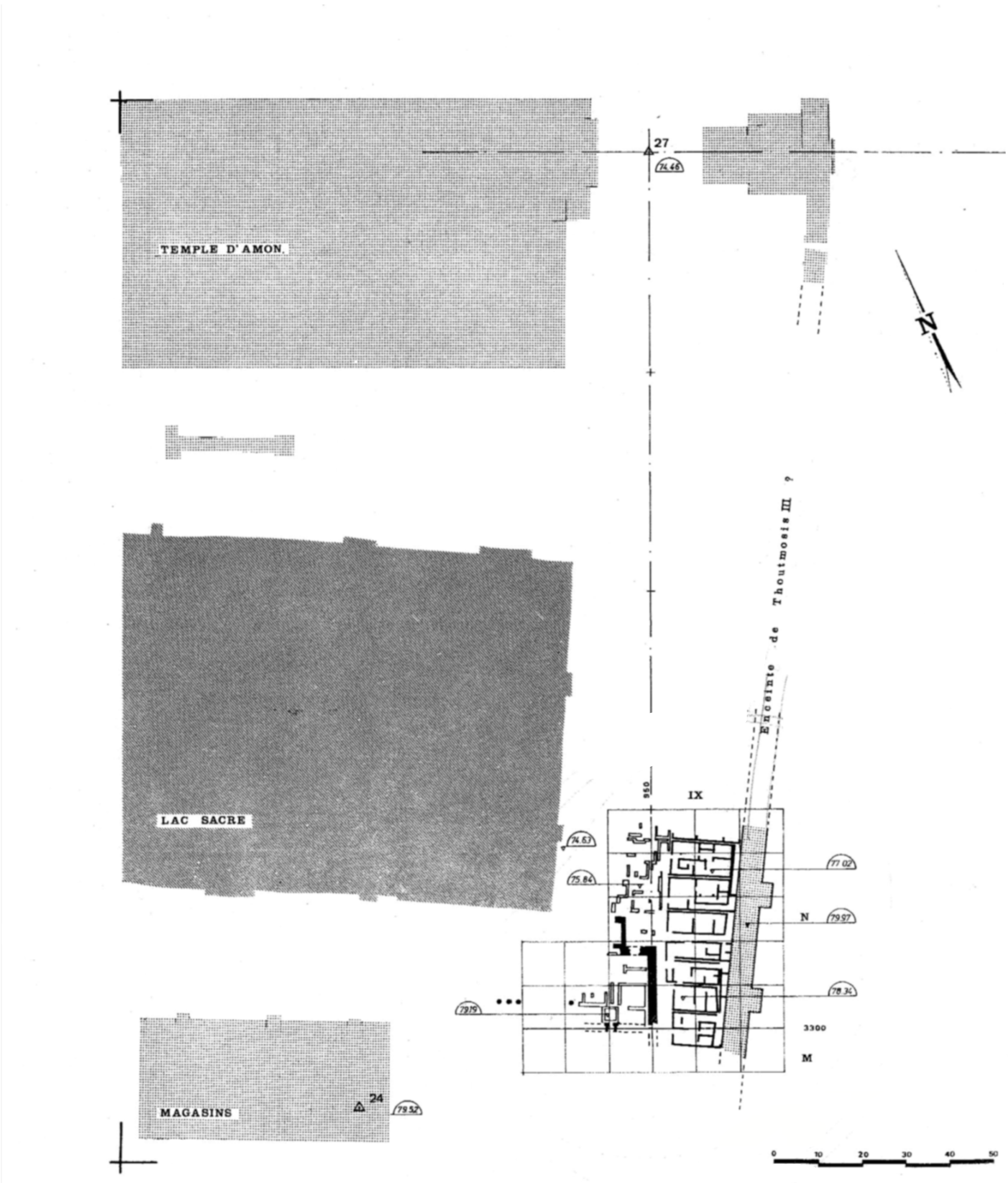


Fig. 4.17. Map of the Temple of Amun area at Karnak showing the priestly houses (Anus and Saad 1971, 218)

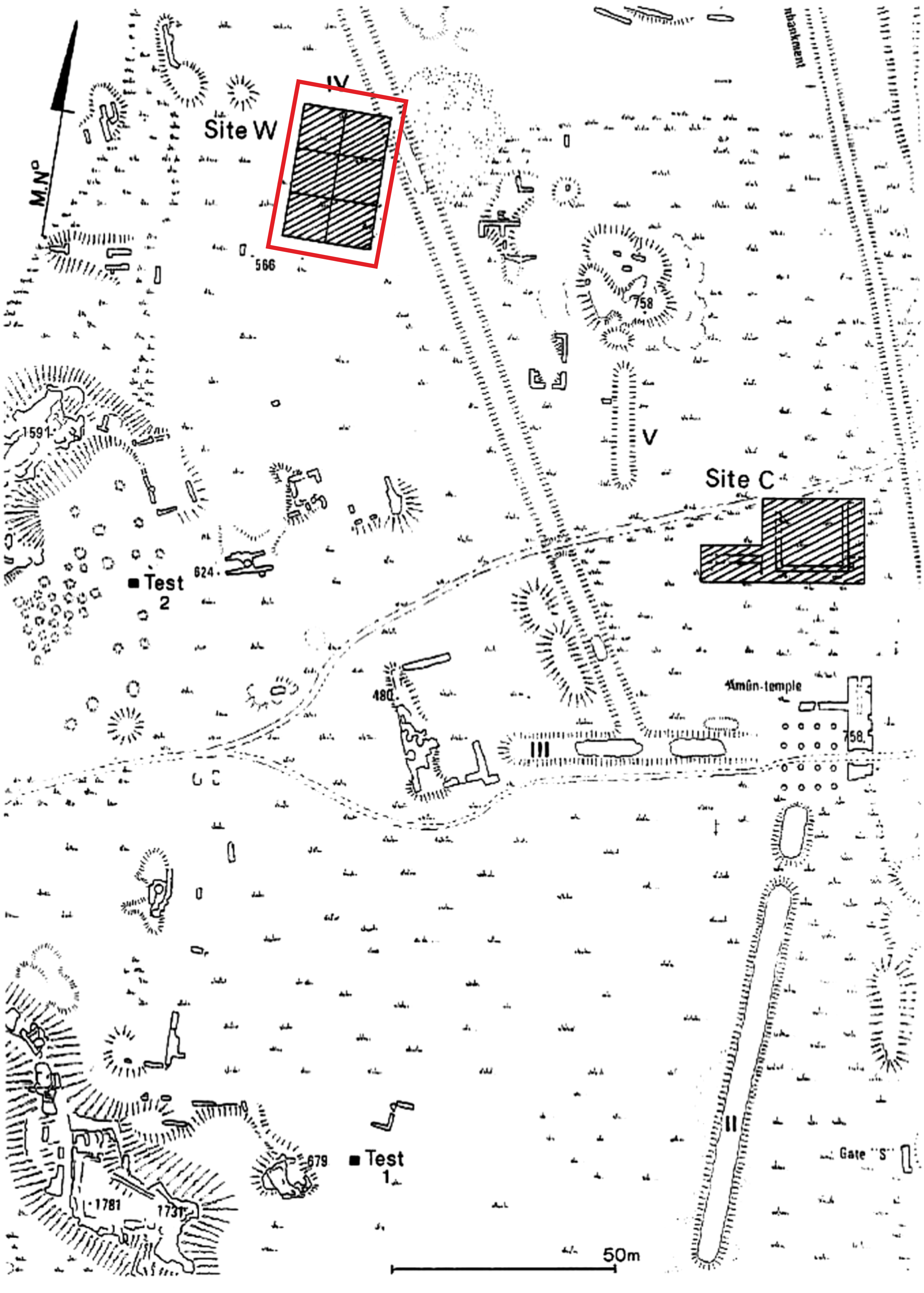


Fig. 4.18. Map of the Eastern area of el-Ashmunein with site W (excavated houses) highlighted (Spencer 1993, pl.1)

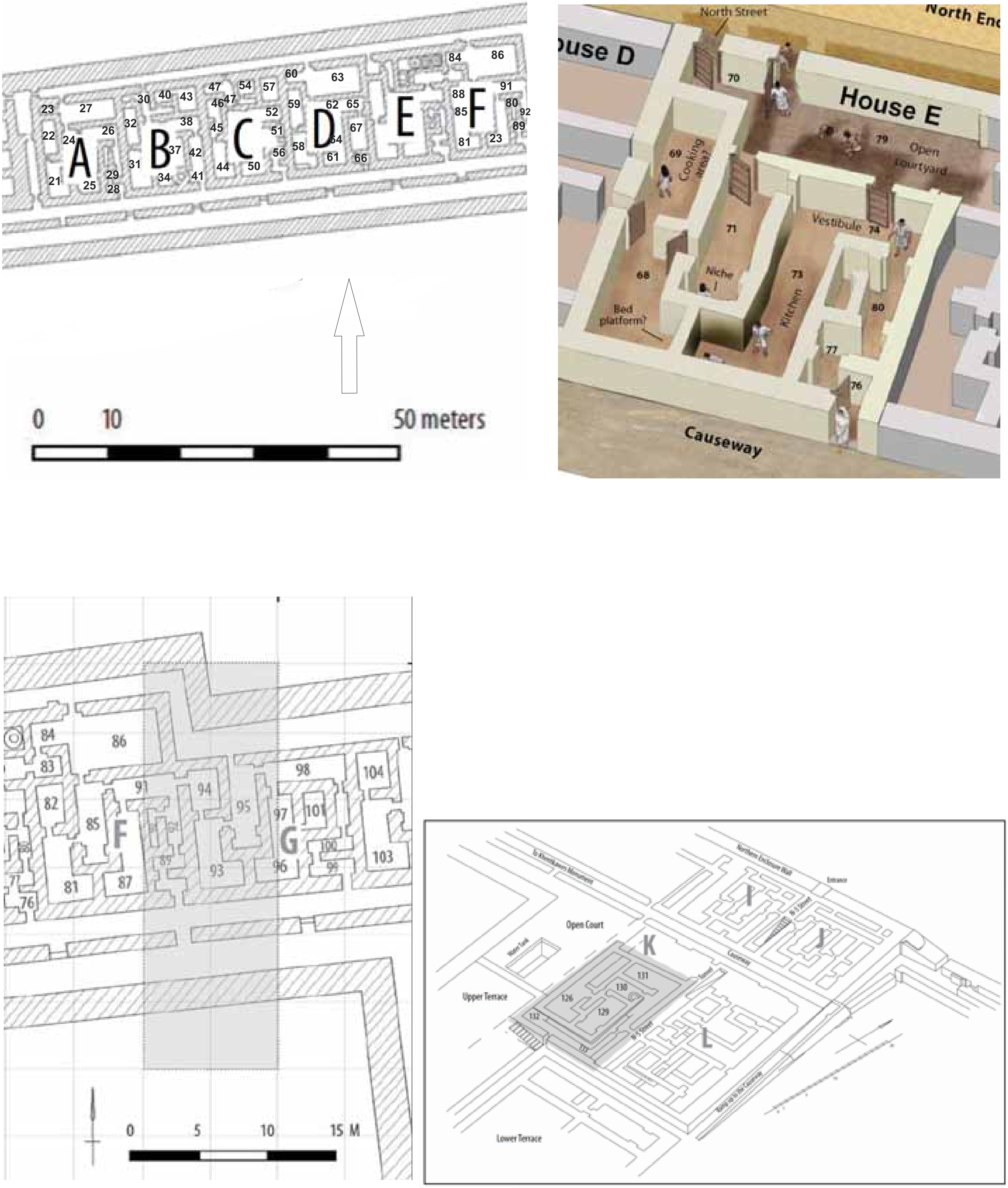


Fig. 4.19.
Top left: houses A to E (Lehner et al 2009, 12);
Top right: house E (Tavares and Yeomans 2009, 11)
Bottom left: houses F and G (Lehner et al 2008, 14);
Bottom right: houses I, J, K and L (Lehner et al 2008, 15).

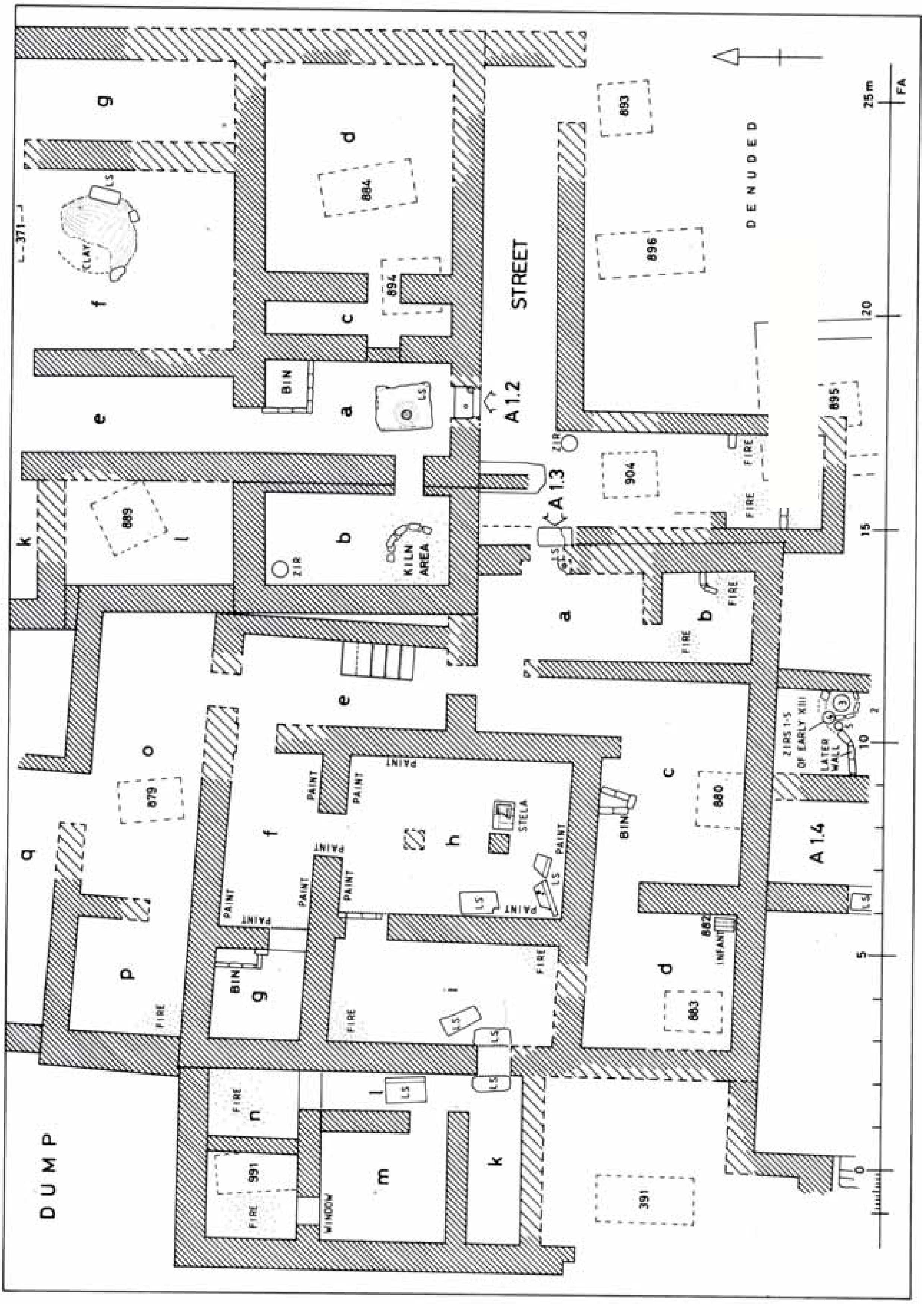


Fig. 4.20. Houses A.1.3 in Lisht (Arnold 1996, 16)

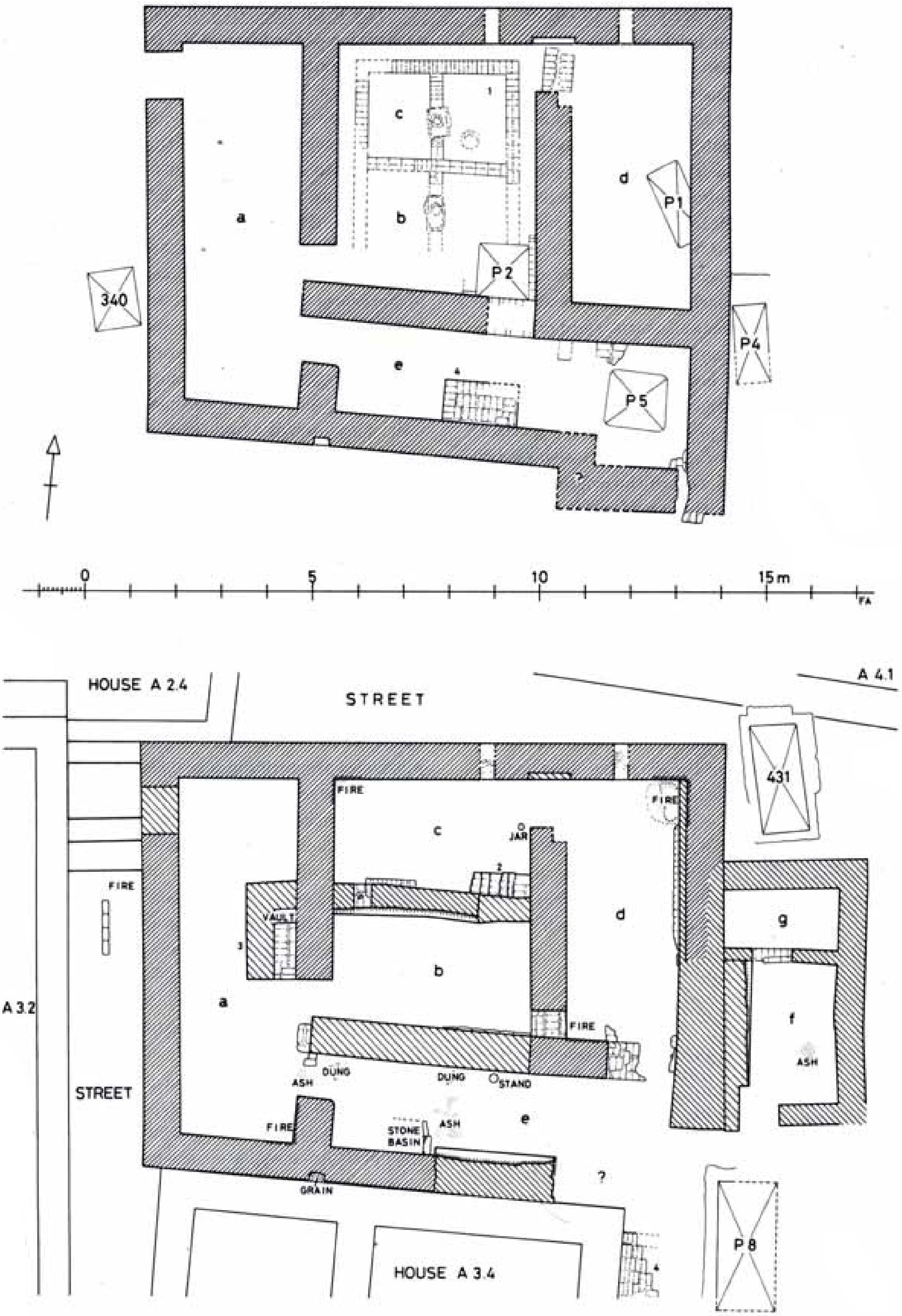


Fig. 4.21.house A 3.3 (13th dynasty): Top: building phase 1 (Arnold 1996, 18)
Bottom: building phase 2-3 (Arnold 1996, 18)

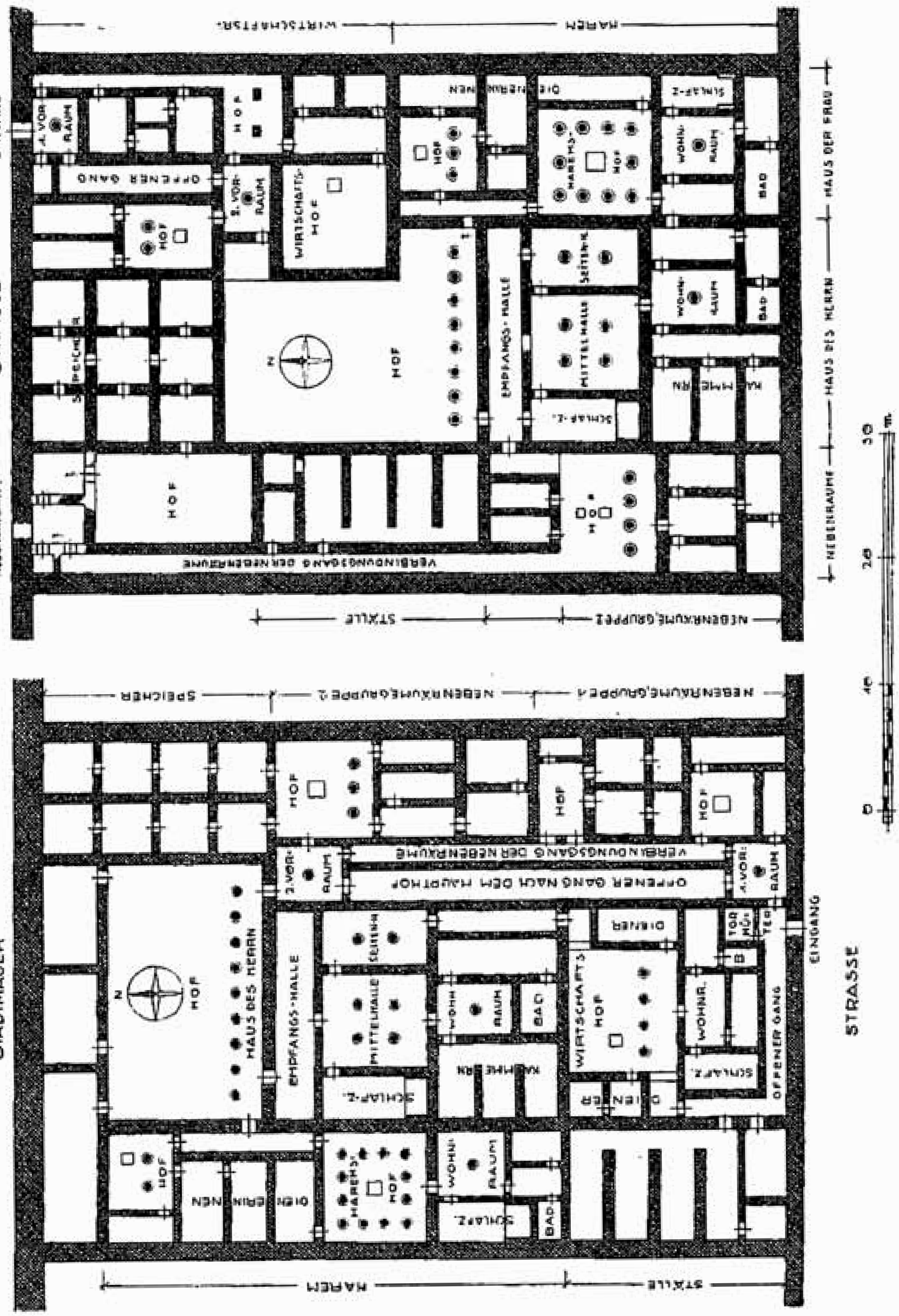
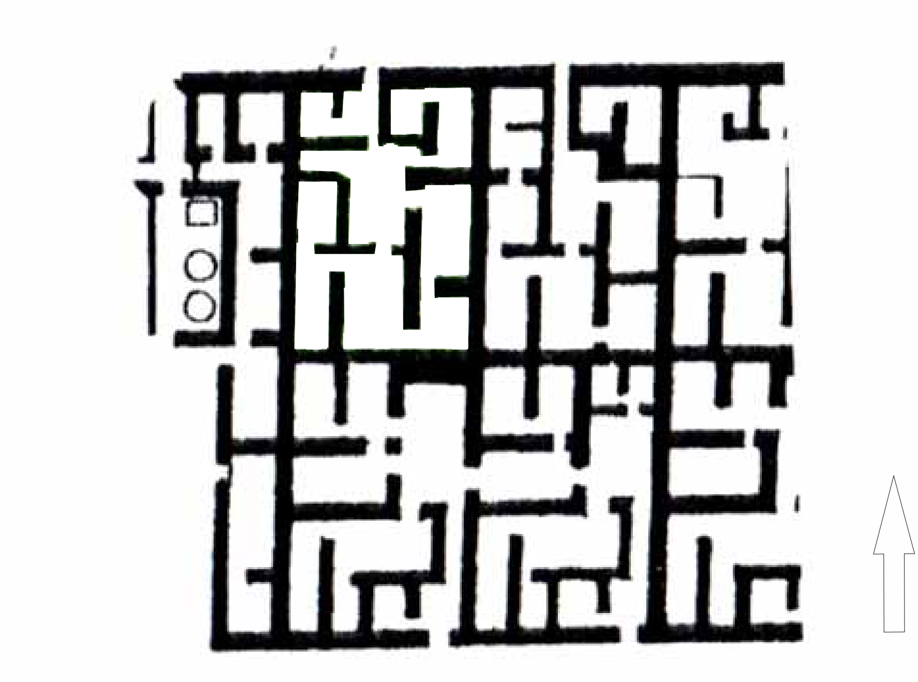


Fig. 4.22. Kahun mansions 1 and 2 ground plans (Ricke 1932, 53)



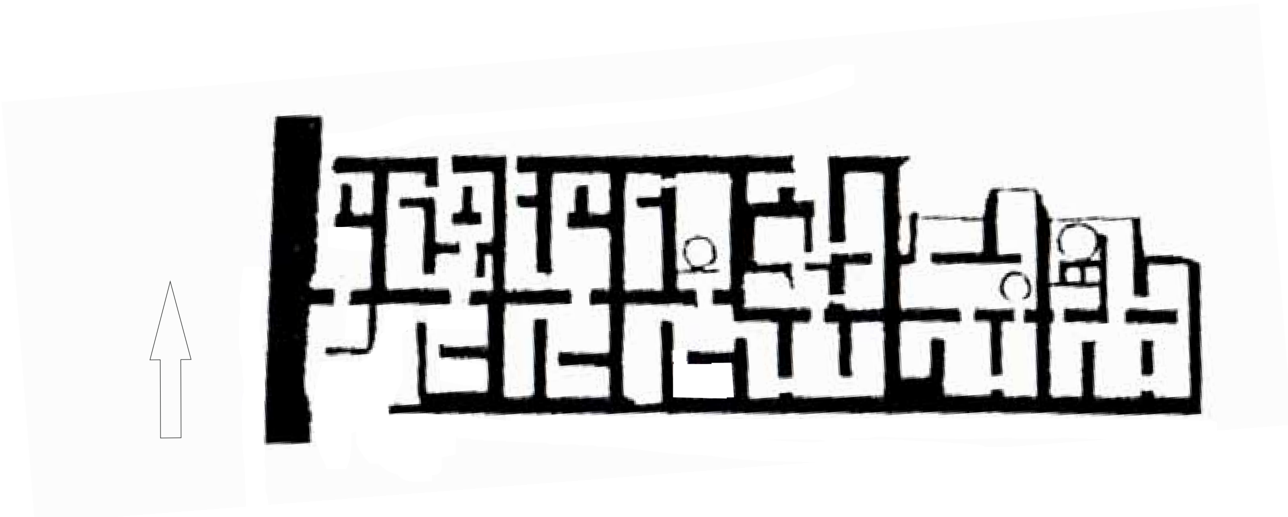


Fig. 4.23. Houses from rank B (top) and A (bottom) of the western town in Kahun (Quirke 2005, 75, 81) (not to scale)

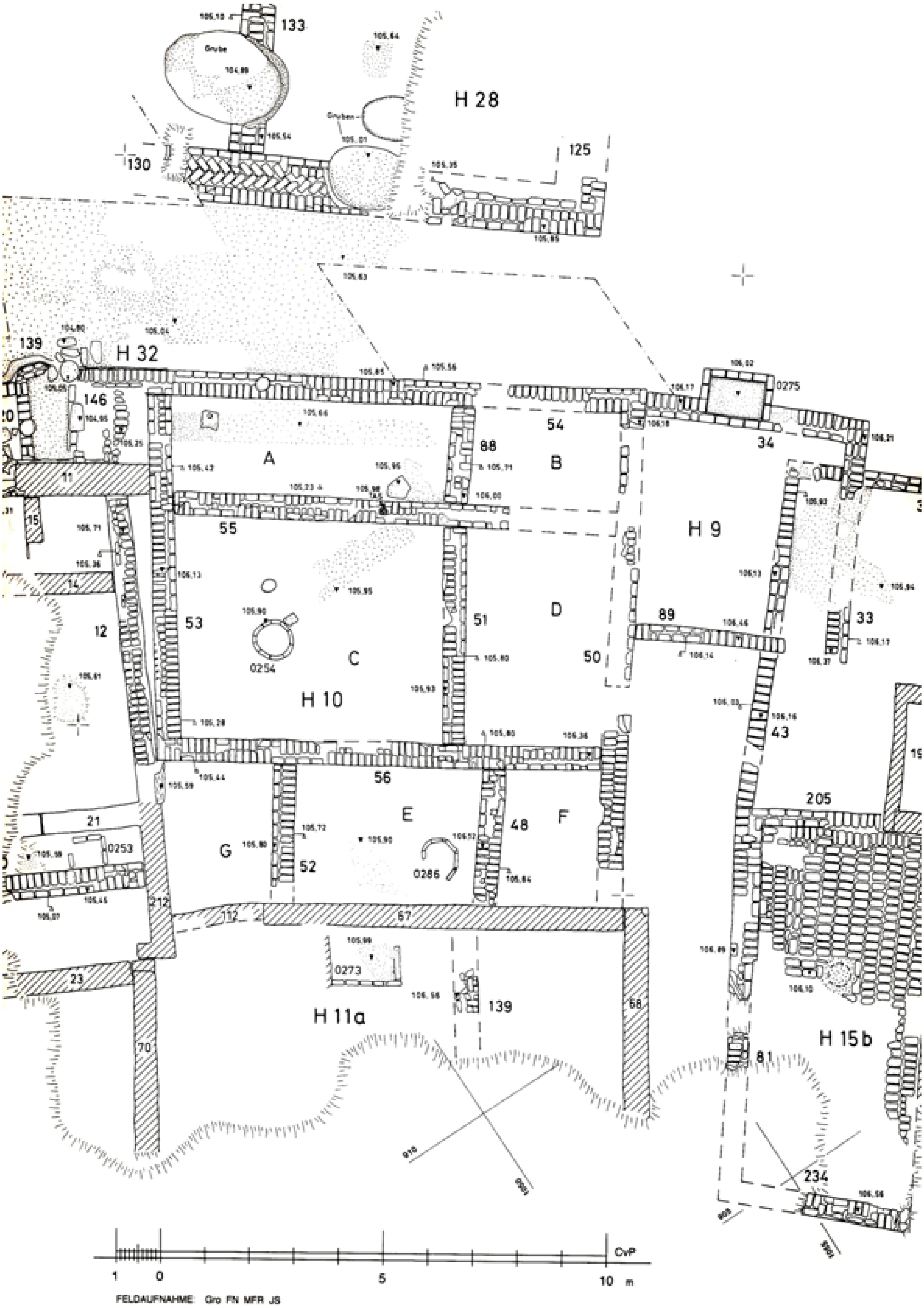


Fig. 4.24. House H10 at Elephantine (Von Pilgrim 1996, Fig. 10)

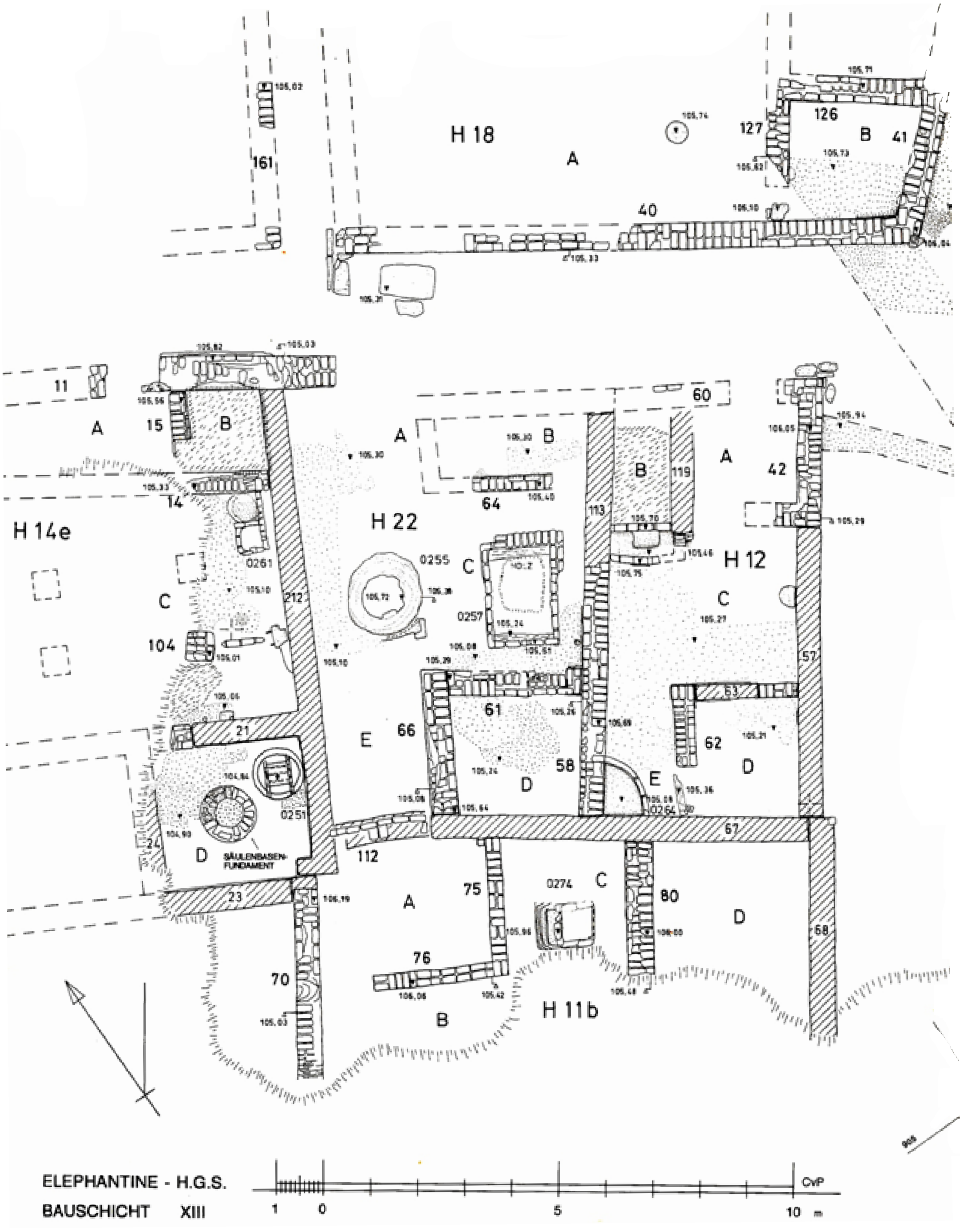


Fig. 4.25. House H12 at Elephantine (Von Pilgrim 1996, Fig. 9)

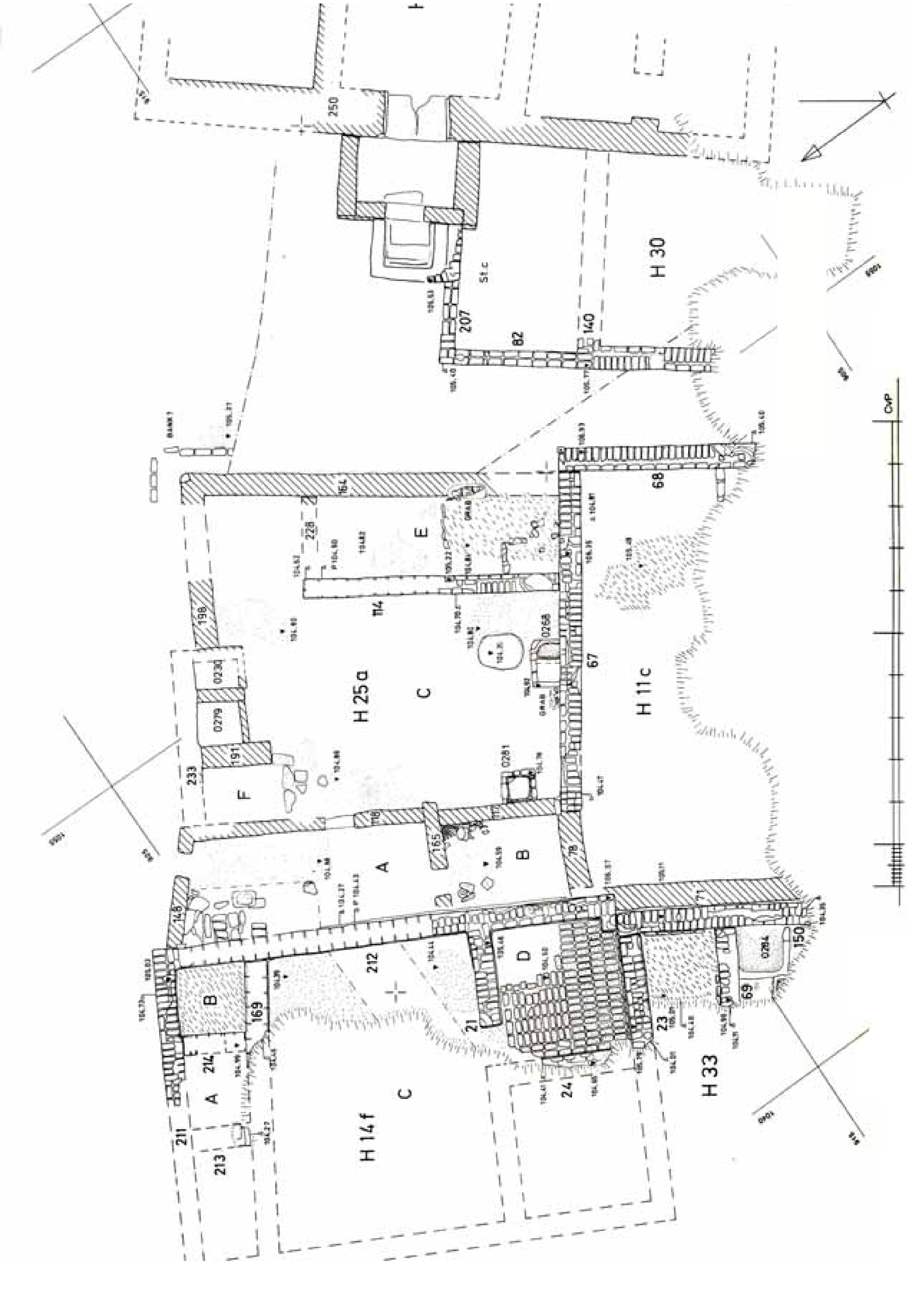


Fig. 4.26. House H25a at Elephantine (Von Pilgrim 1996, Fig. 4)

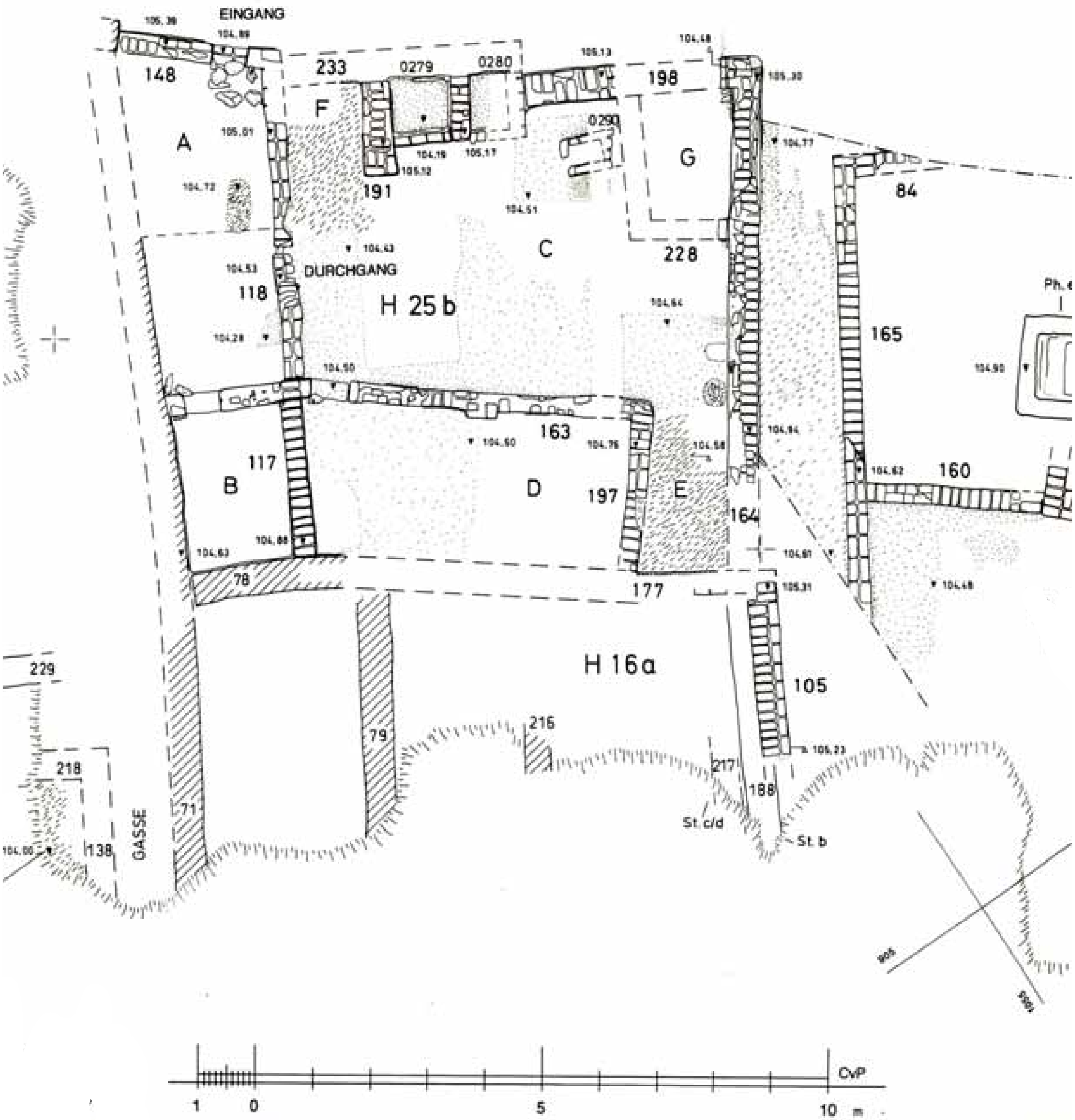


Fig 4.27. House H25b at Elephantine (Von Pilgrim 1996, Fig.3)

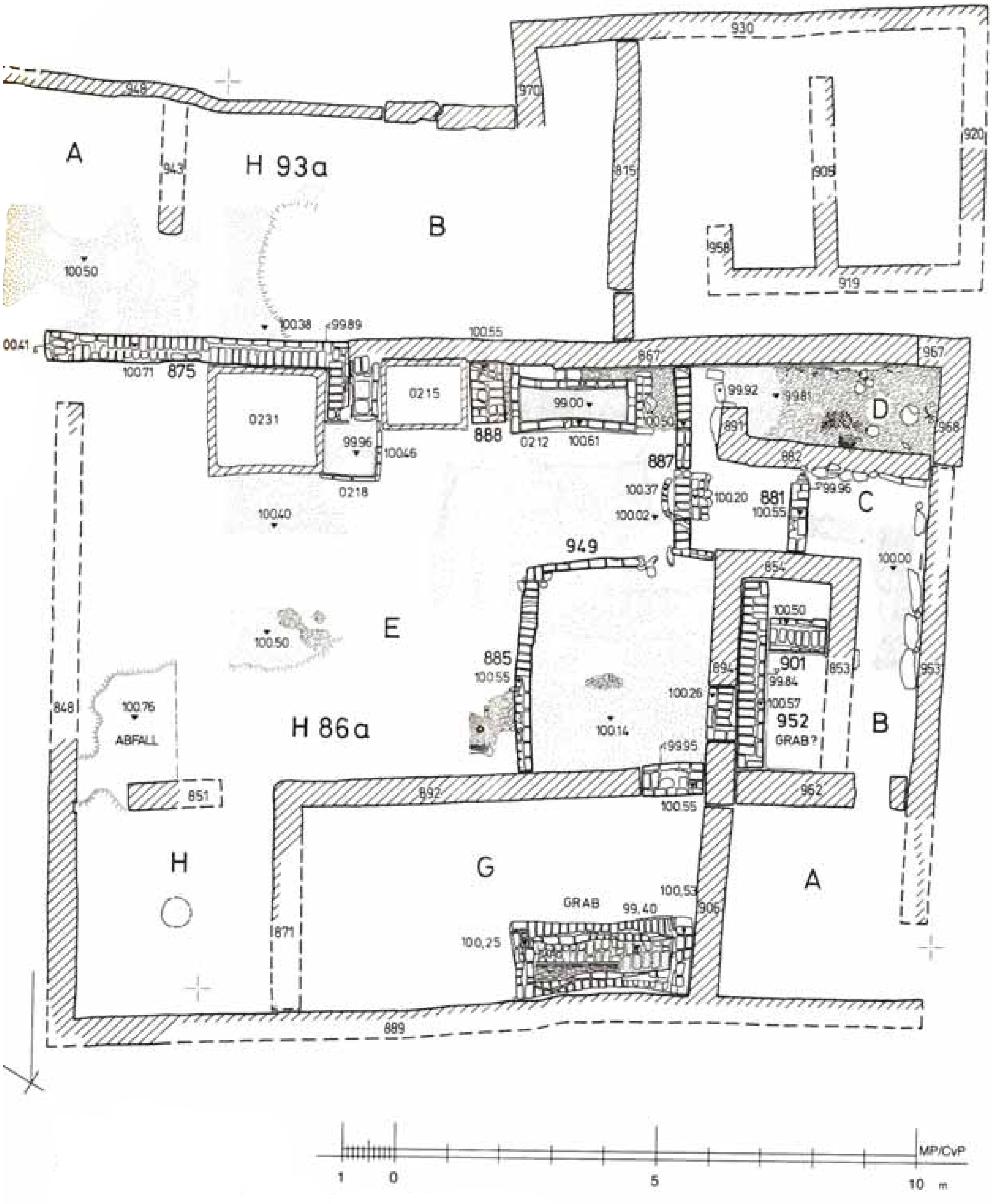


Fig. 4.28. House H86a at Elephantine (Von Pilgrim 1996, Fig. 23)

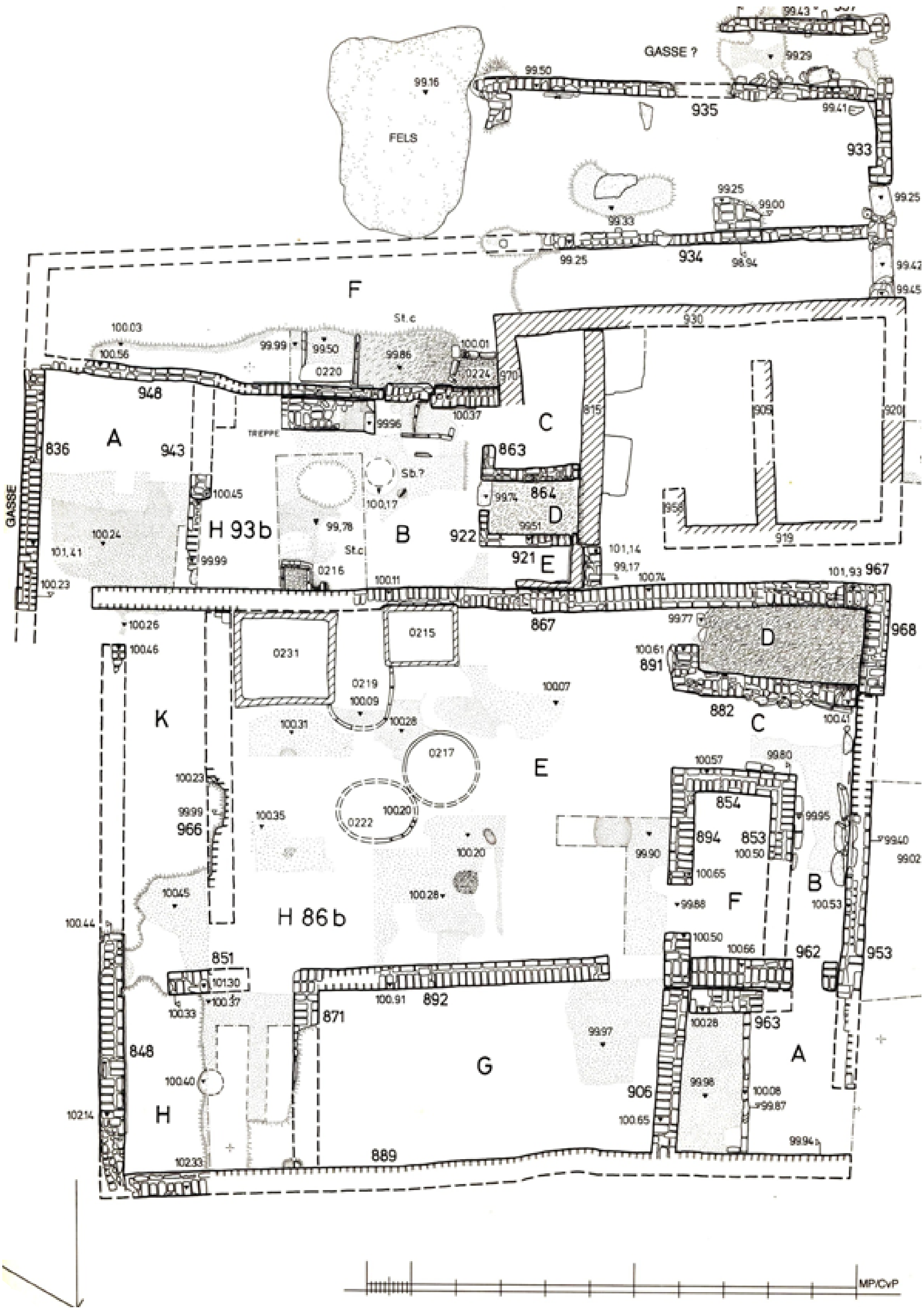


Fig. 4.29. House H86b at Elephantine (Von Pilgrim 1996, Fig. 22)

Fig. 4.30. Houses 5, 6, 7 and 8 of F/I planned settlement at Tell el-Daba (Middle Kingdom) (Czerny 1999, 22)

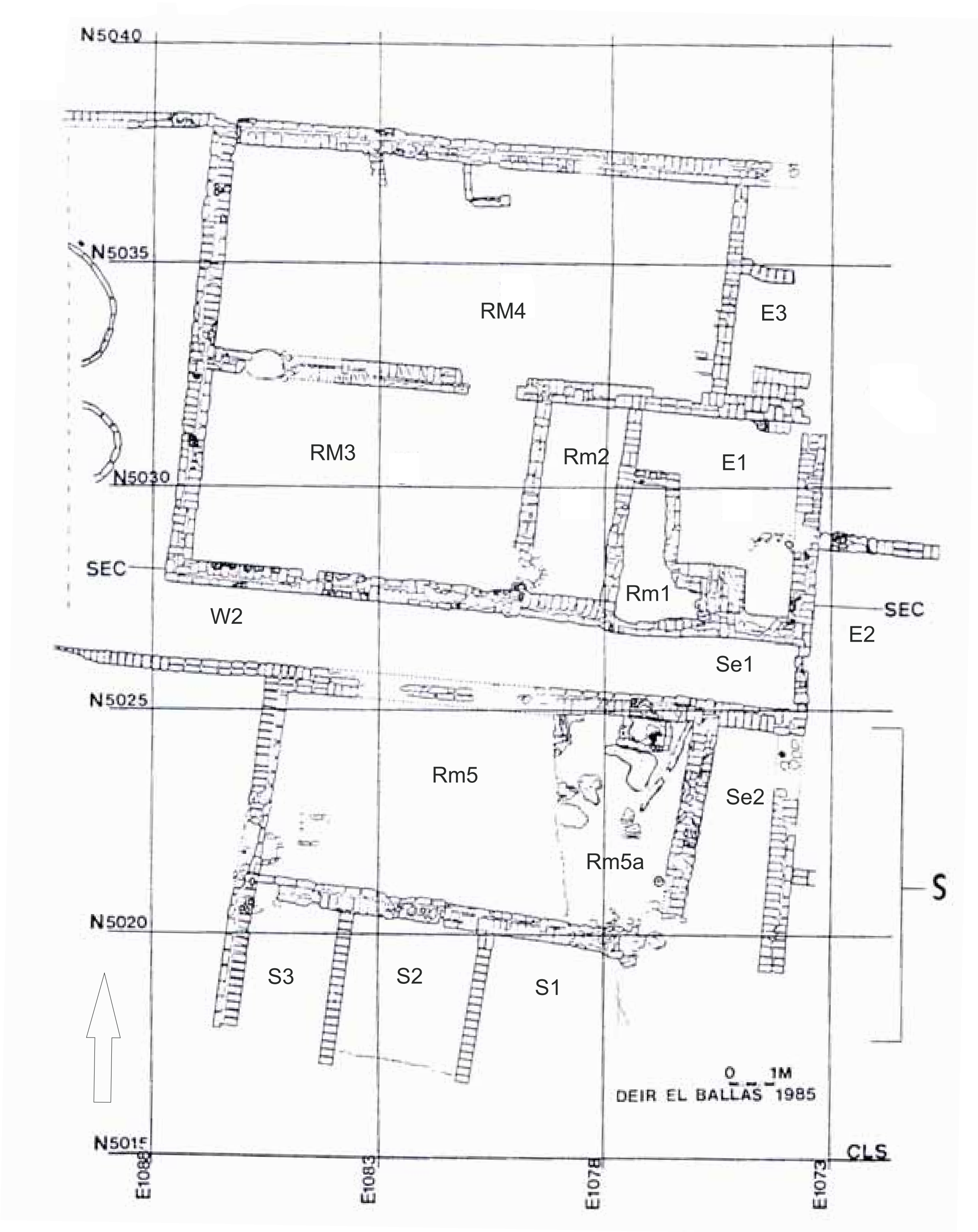


Fig. 4.31. Plan of house E at Deir el-Ballas (Lacovara 1997, 169)

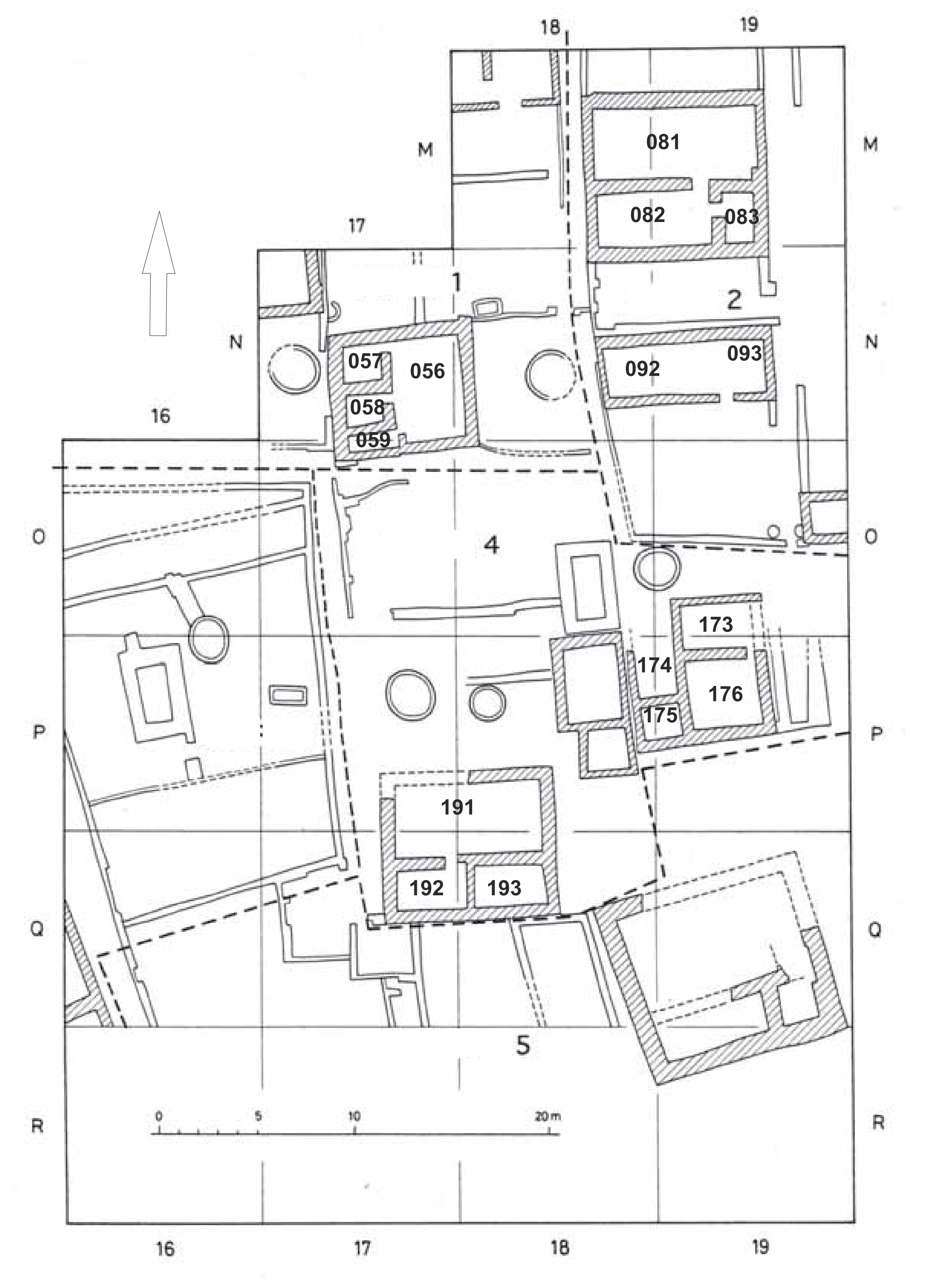


Fig. 4.32. Excavation of A/V area (Second Intermediate Period) showing districts 1, 2 and 4, where houses from the sample are located (Hein and Janosi 2004, 64)

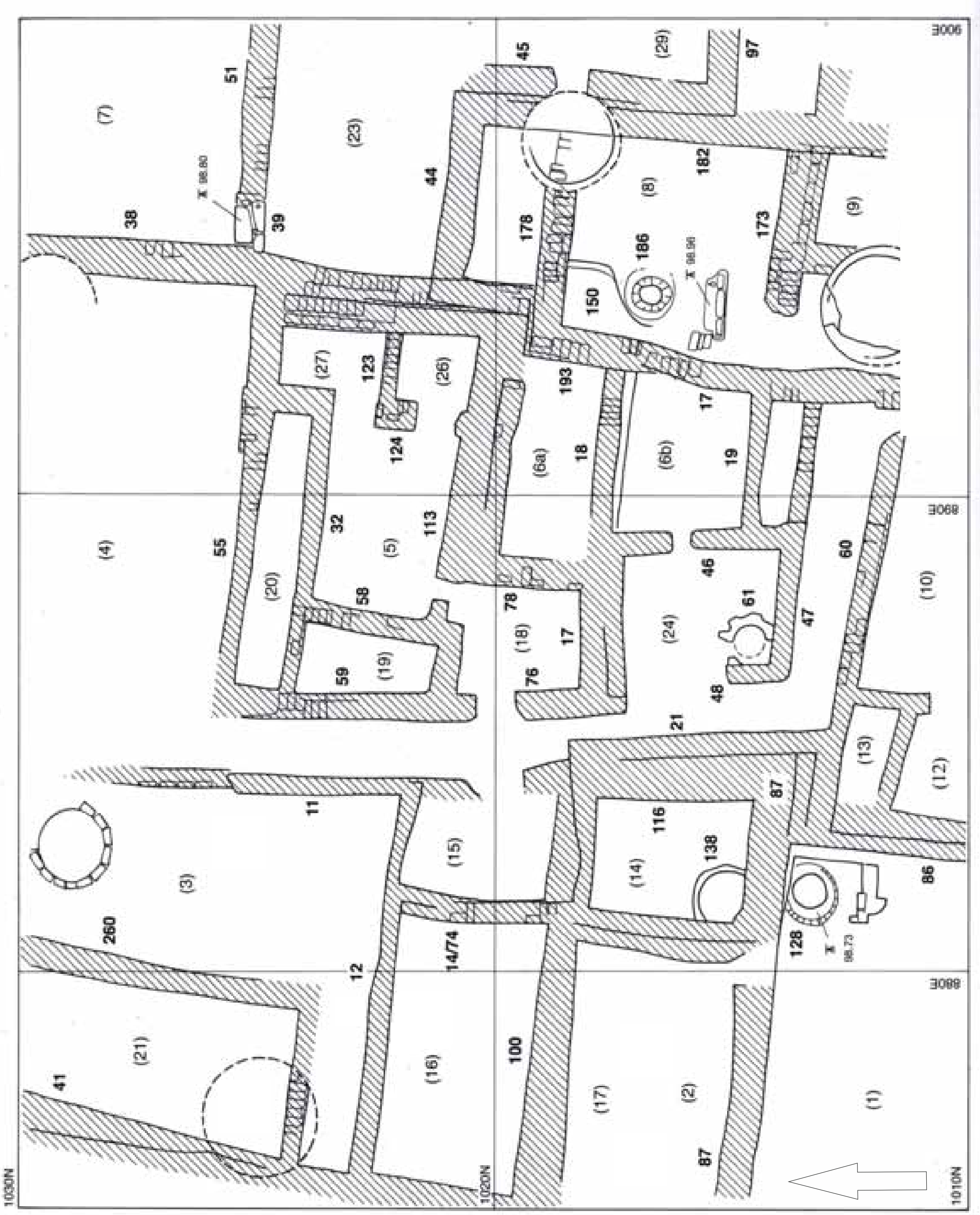


Fig. 4.33. RAT site at Memphis, level II (Jeffreys 2006, 40)

A1.Transverse hall
A2.Central hall
A3.South-east suite
A4.Courtyard
A5.Courtyard
A5a.Unspecified
A7.South-east suite
A8.South-east suite
A9.Entrance hall
A10.Anteroom
A11.Side chamber
A12.Side chamber
A13.Side chamber
A14.Side chamber
A15.South chamber
A16.South-east suite
A17.South chamber

1.Transverse hall
2.Central hall
3.Side room
4.South-east suite
5.Unspecified
5aUnspecified.
5b.Unspecified
6.South-east suite
7.South-east suite
8.South-east suite
9.Entrance hall
10.Side room
11.Side room
12.Staircase room
13.South suite
14.South suite
15.South suite
17.South suite

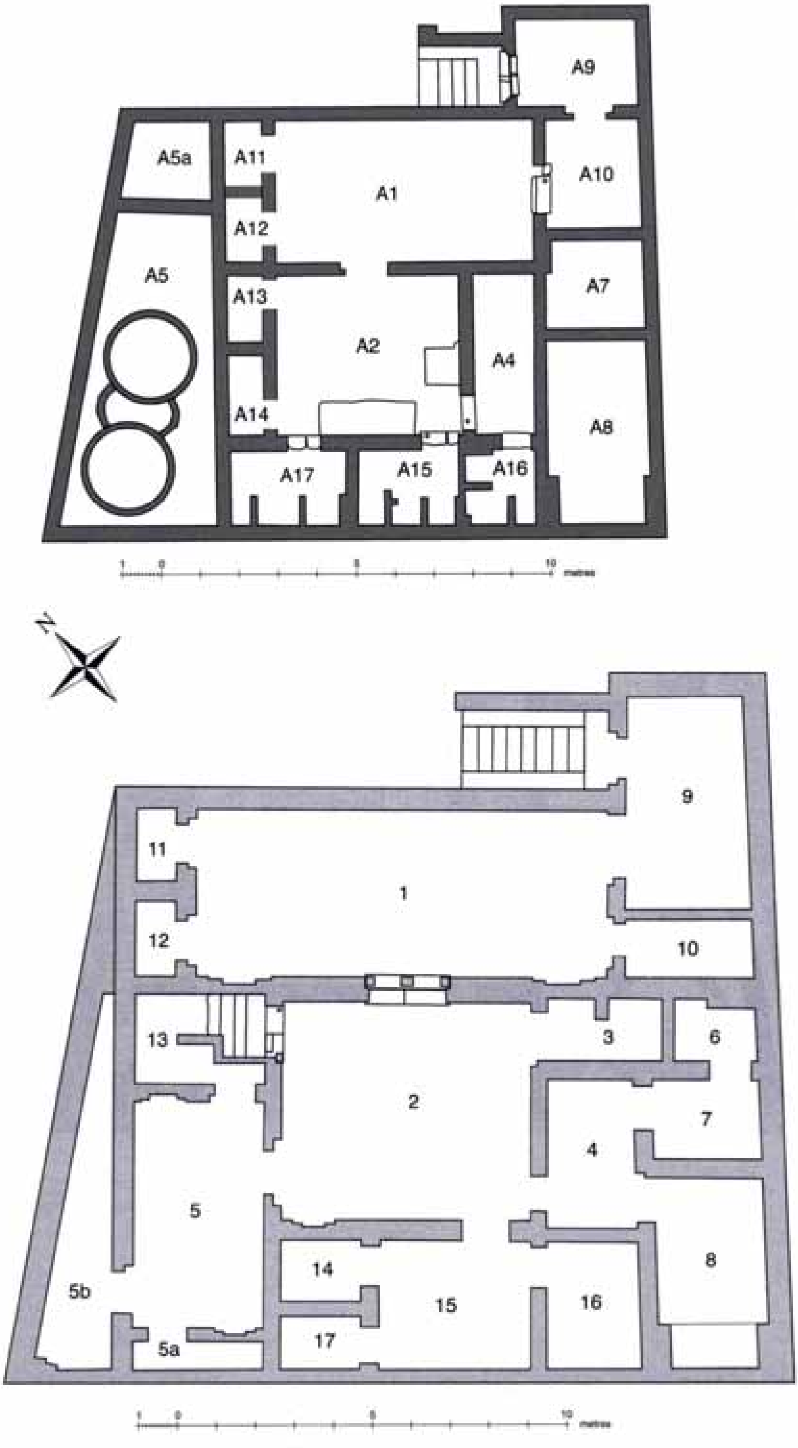
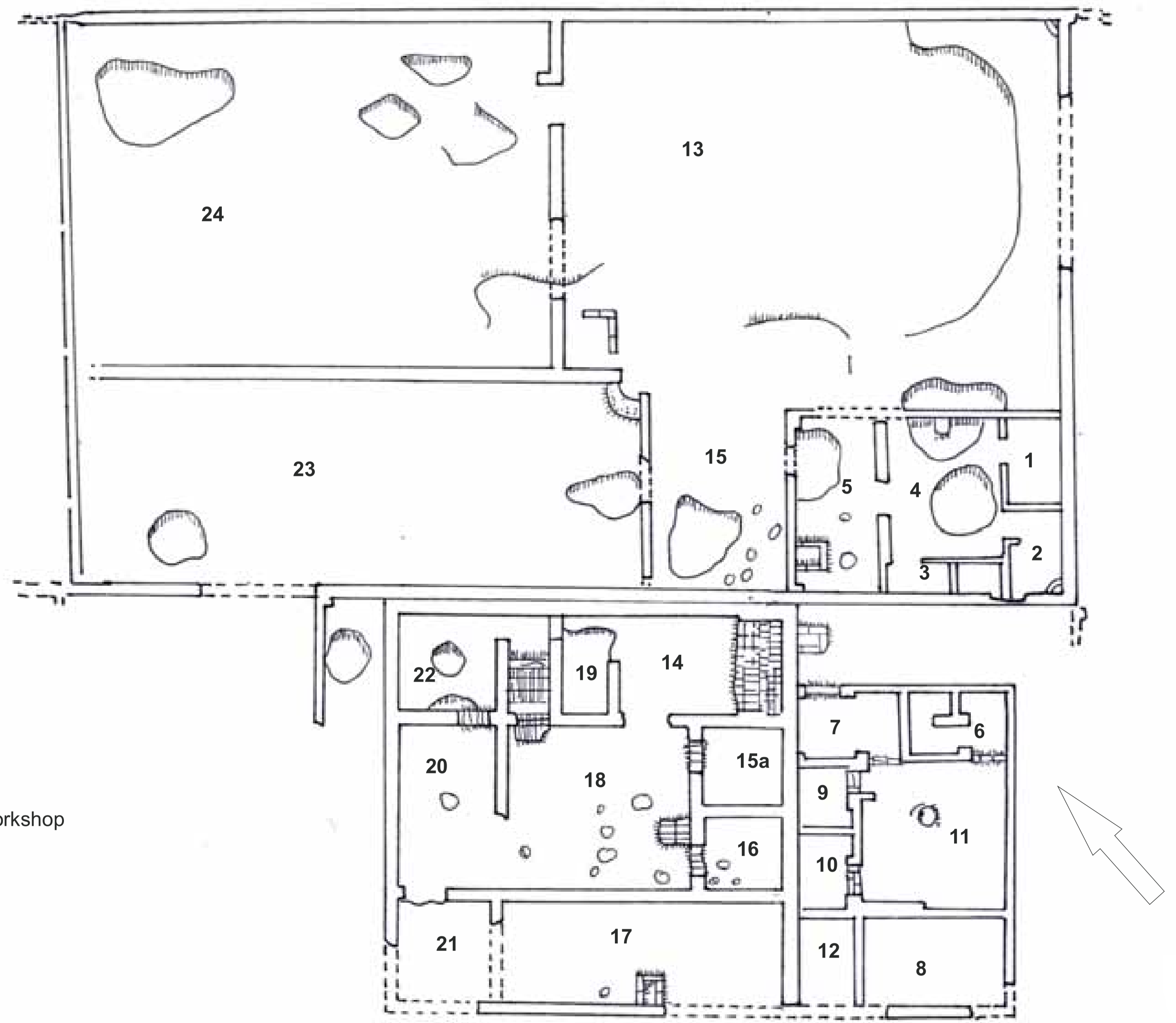


Fig. 4.34. Phases I (N49.58) and II (N49.18) of Ranefer's house (Kemp 2010, 15)



1.Unspecified
2.Unspecified
3.Unspecified
4.Unspecified
5.Unspecified
6.Unspecified
7.Unspecified
8.Broad hall
9.Small room
10.Small room
11.Deep hall
12.Side room

13.Courtyard
14.Bedroom
15a.Storage
15.Courtyard
16.Storage
17.Utility room/workshop
18.Deep hall
19.Staircase
20.Broad hall
21.Anteroom
22.Side room
23.Courtyard
24.Courtyard

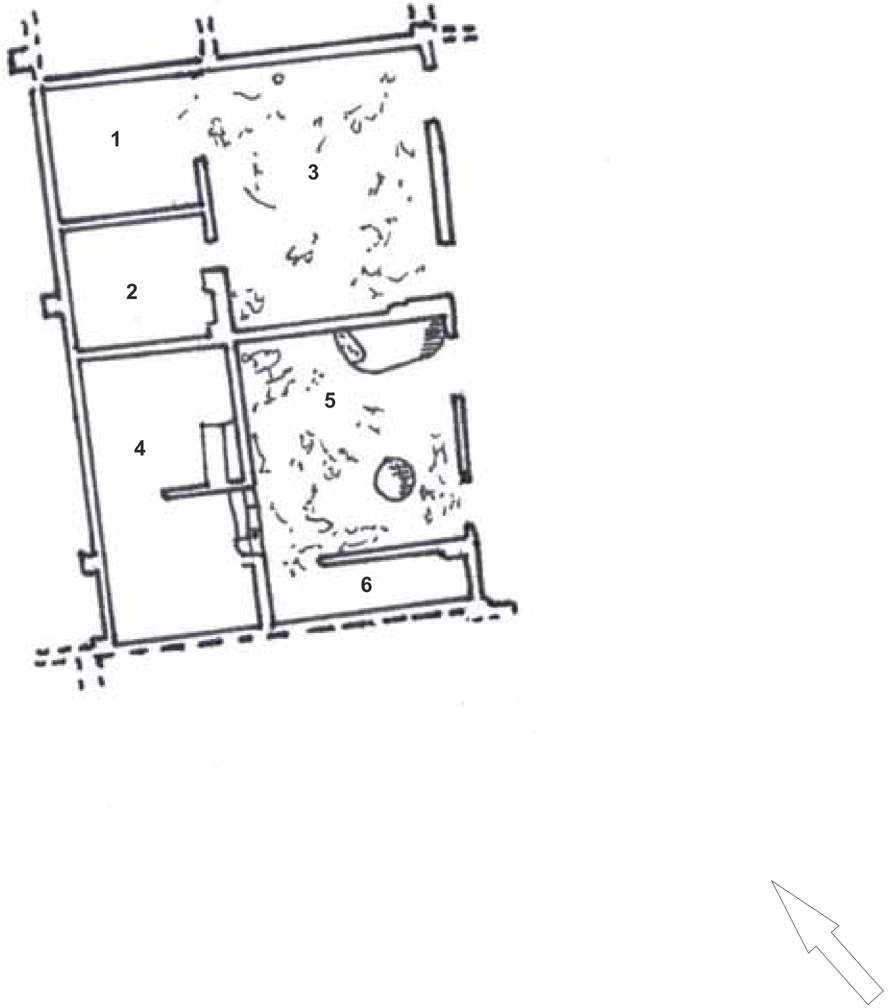
Fig. 4.35. House O47.8 in Amarna (after Borchardt and Ricke 1980, plan 25) (not to scale)

1.Unknown
2.Unknown
3.Unknown
4.Unspecified
5.Unspecified
6.Unspecified
7.Unspecified
8.Staircase
9.Unspecified
10.Unspecified
11.Courtyard
12.Side room
13.Side room
14.Hallway
15.Side room
16.Side room
17.Side room
18.Side room
19.Small room
20.Main living room
21.Small room
22.Side room
23.Small room
24.Small room
25.Main living room
26.Stairs
27.Stairs
28.Small room
29.Large side room
30.Open hall

Fig. 4.36. House Q47.23 in Amarna (after Borchardt and Ricke 1980, plan 49) (not to scale)

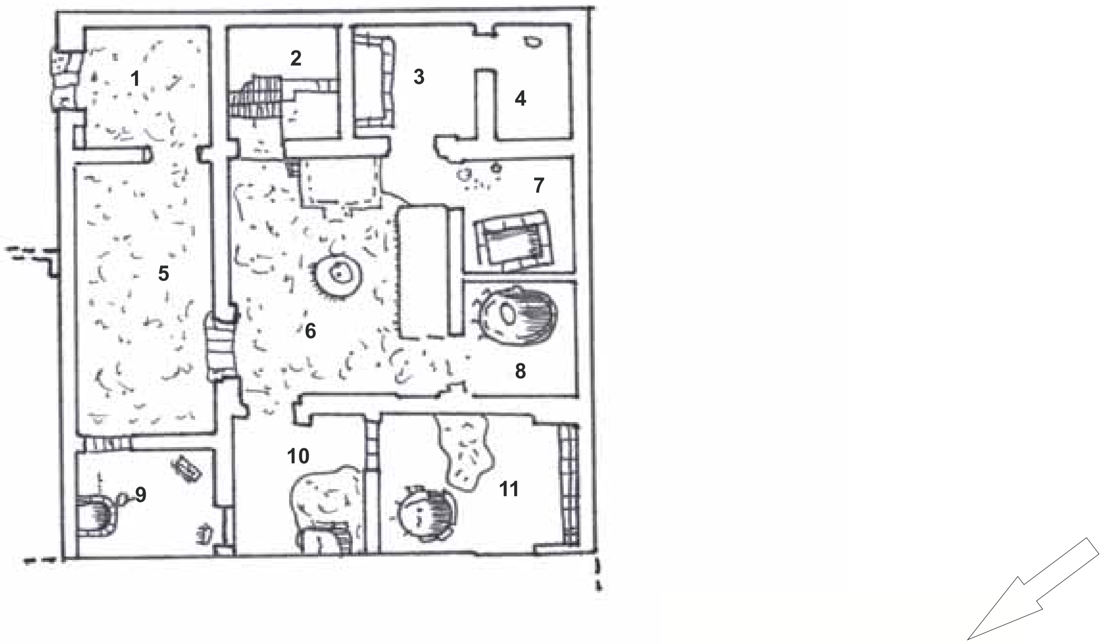
1.Narrow passage
2.Anteroom
3.Main living room
4.Secondary room
5.Narrow passage
6.Staircase
7.Auxiliary room
8.Auxiliary room
9.Narrow passage
10.Small room
11.Small room
12.Main living room
13.Staircase
14.Unspecified
15.Lobby
16.Courtyard
17.Atrium
18.Steps
19.Transverse chamber
20.Side room
21.Deep central hall
22.Side room
23.Side room
24.Side room
25.Main vestibule
26.Vestibule
27.Unspecified
28.Unspecified
29.Vestibule
30.Open hall
31.Unspecified
32.Passage
33.Side room
34.Side room
35.Main living room
36.Steps
37.Steps
38.Anteroom

Fig. 4.37. House N49.6. in Amarna (after Borchardt and Ricke 1980, plan 71) (not to scale)



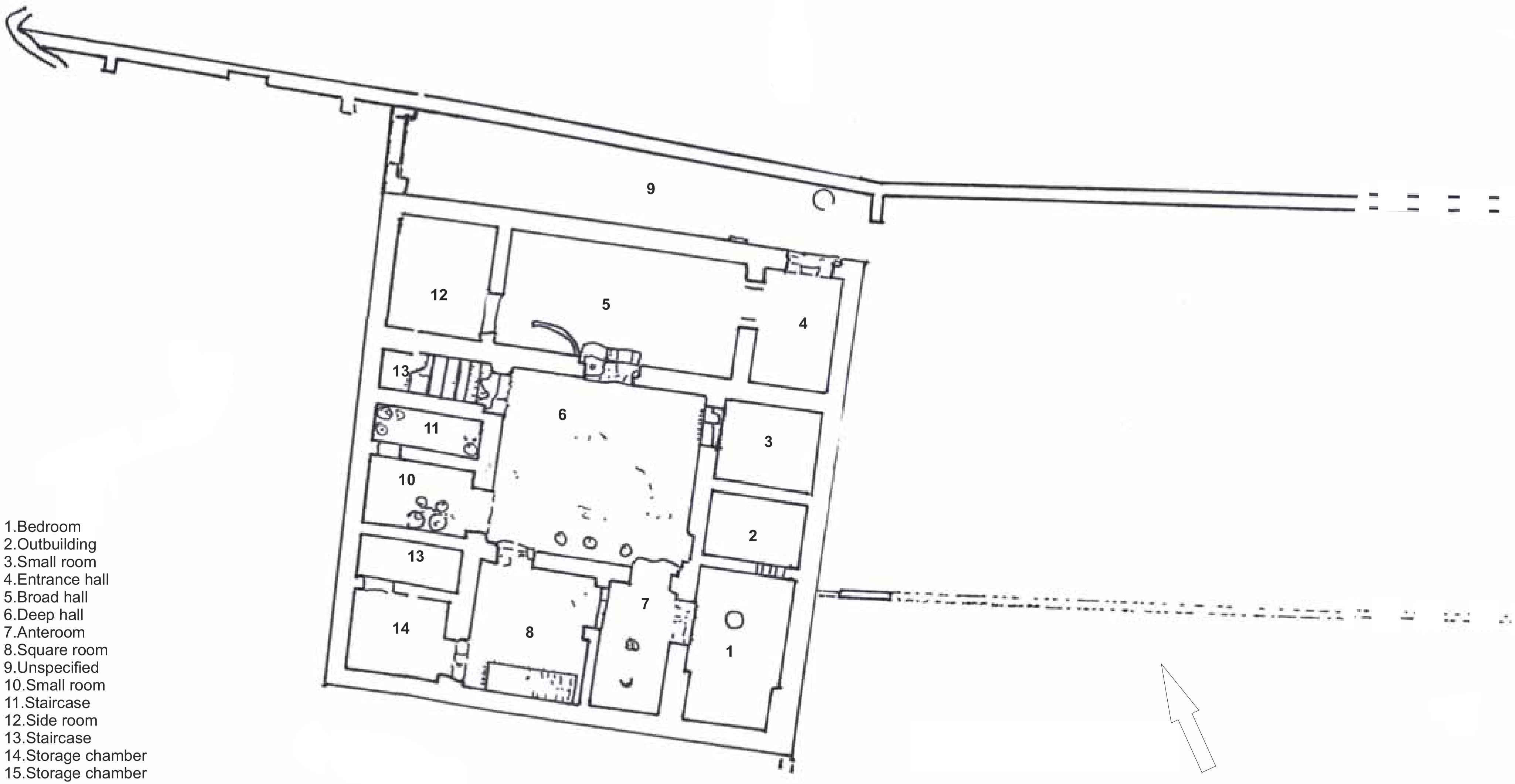
1.Unspecified
2.Unspecified
3.Living room
4.Unspecified
5.Unspecified
6.Staircase

Fig. 4.38. House N50.19. in Amarna (after Borchardt and Ricke 1980, plan 101) (not to scale)



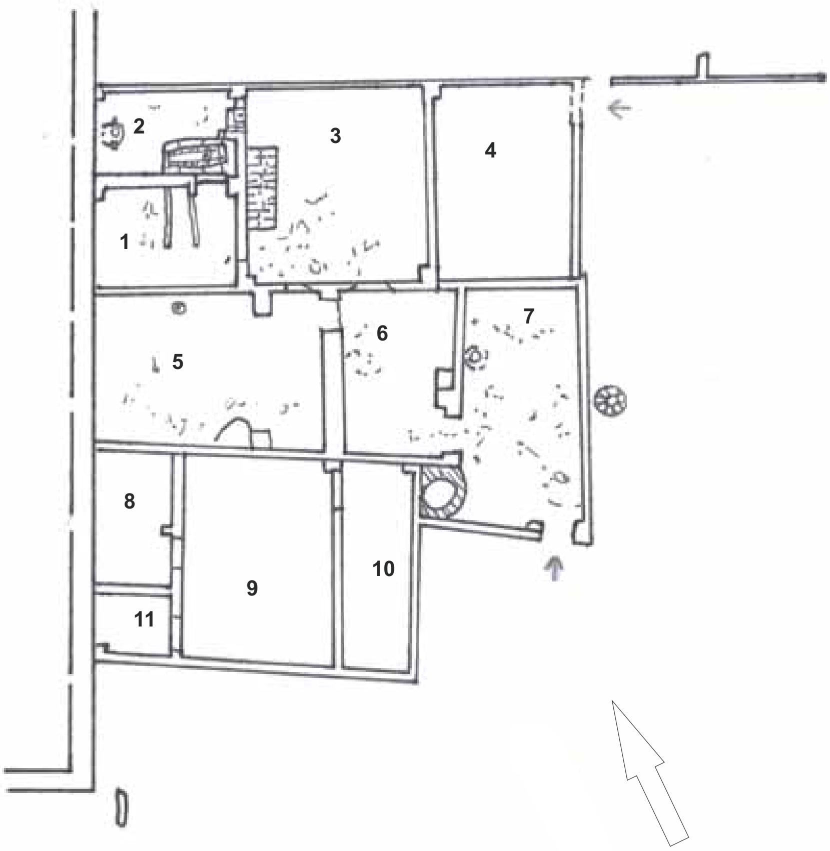
1.Entrance hall
2.Staircase/gap
3.Square room
4.Unspecified
5.Unspecified
6.Broad hall
7.Deep hall
8.Unspecified
9.Unspecified
10.Anteroom
11.Bedroom

Fig. 4.39. House N51.4. in Amarna (after Borchardt and Ricke 1980, plan 110) (not to scale)



1.Bedroom
2.Outbuilding
3.Small room
4.Entrance hall
5.Broad hall
6.Deep hall
7.Anteroom
8.Square room
9.Unspecified
10.Small room
11.Staircase
12.Side room
13.Staircase
14.Storage chamber
15.Storage chamber

Fig. 4.40. House P47.6. in Amarna (after Borchardt and Ricke 1980, plan 29) (not to scale)



1.Adjoining room
2.Adjoining room
3.Main living room
4.Entrance hall
5.Main living room
6.Anteroom
7.Courtyard
8.Adjoining room
9.Main living room
10.Entrance hall to 9
11.Adjoining room

Fig. 4.41. House 049.14. in Amarna (after Borchardt and Ricke 1980, plan 80) (not to scale)

1.Unspecified
2.Unspecified
3.Bedroom
4.Dressing room
5.Side room
6.Entrance hall
7.Unspecified
8.Night rooms
9.Unspecified
10.Square room
11.Side room
12.Side room
13.Deep hall
14.Side room
15.Unspecified
16.Staircase
17.Small room
18.Small room
19.Unspecified
20. Deep hall
21.Second hall
22.First antechamber
+ entrance steps

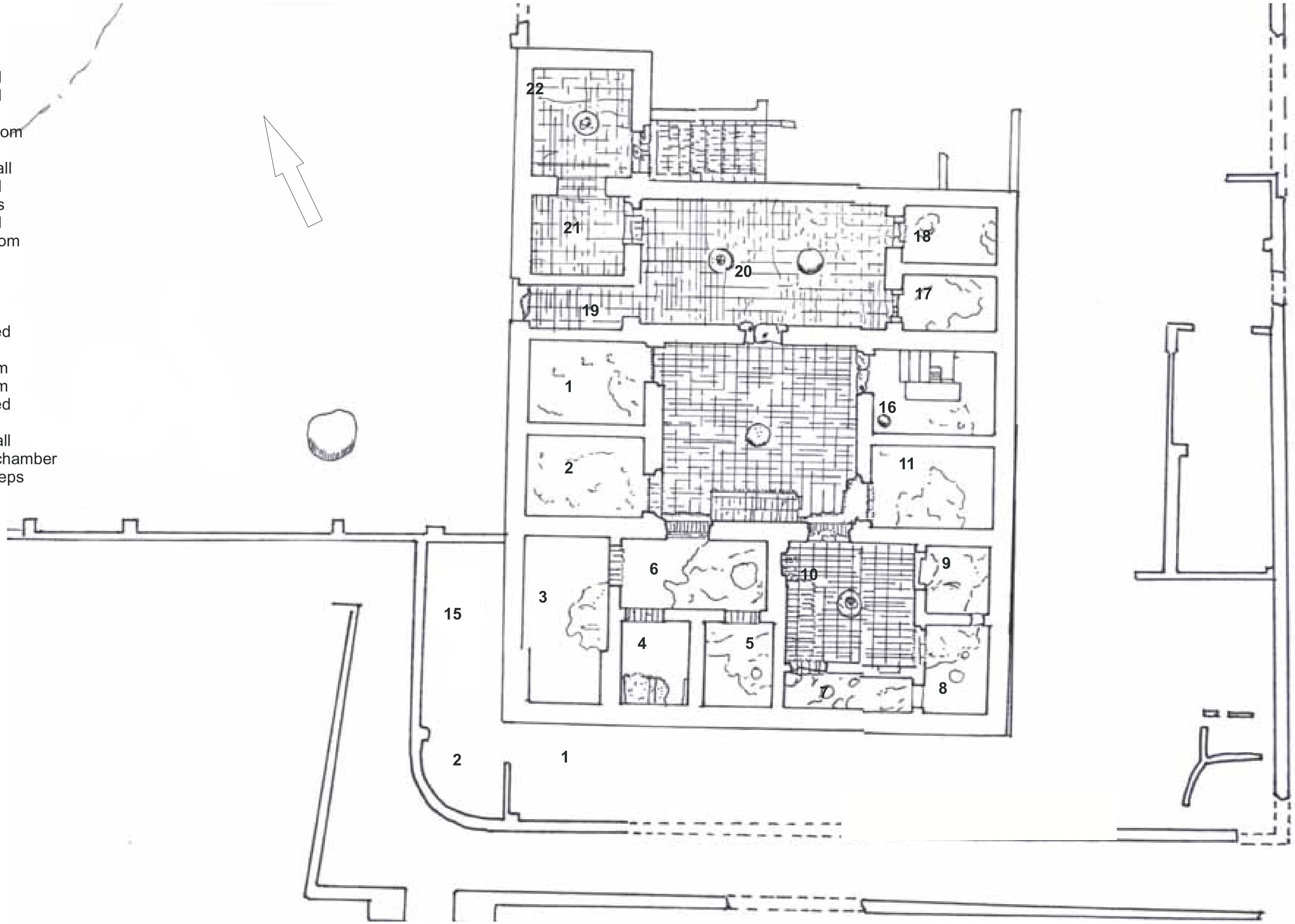


Fig 4.42. House Q46.2. in Amarna (after Borchardt and Ricke 1980, plan 3) (not to scale)

Fig. 4.43. Houses at Karnak (East of Temple of Amun sacre lake) (Anus and Saad 1971, fig. 5)

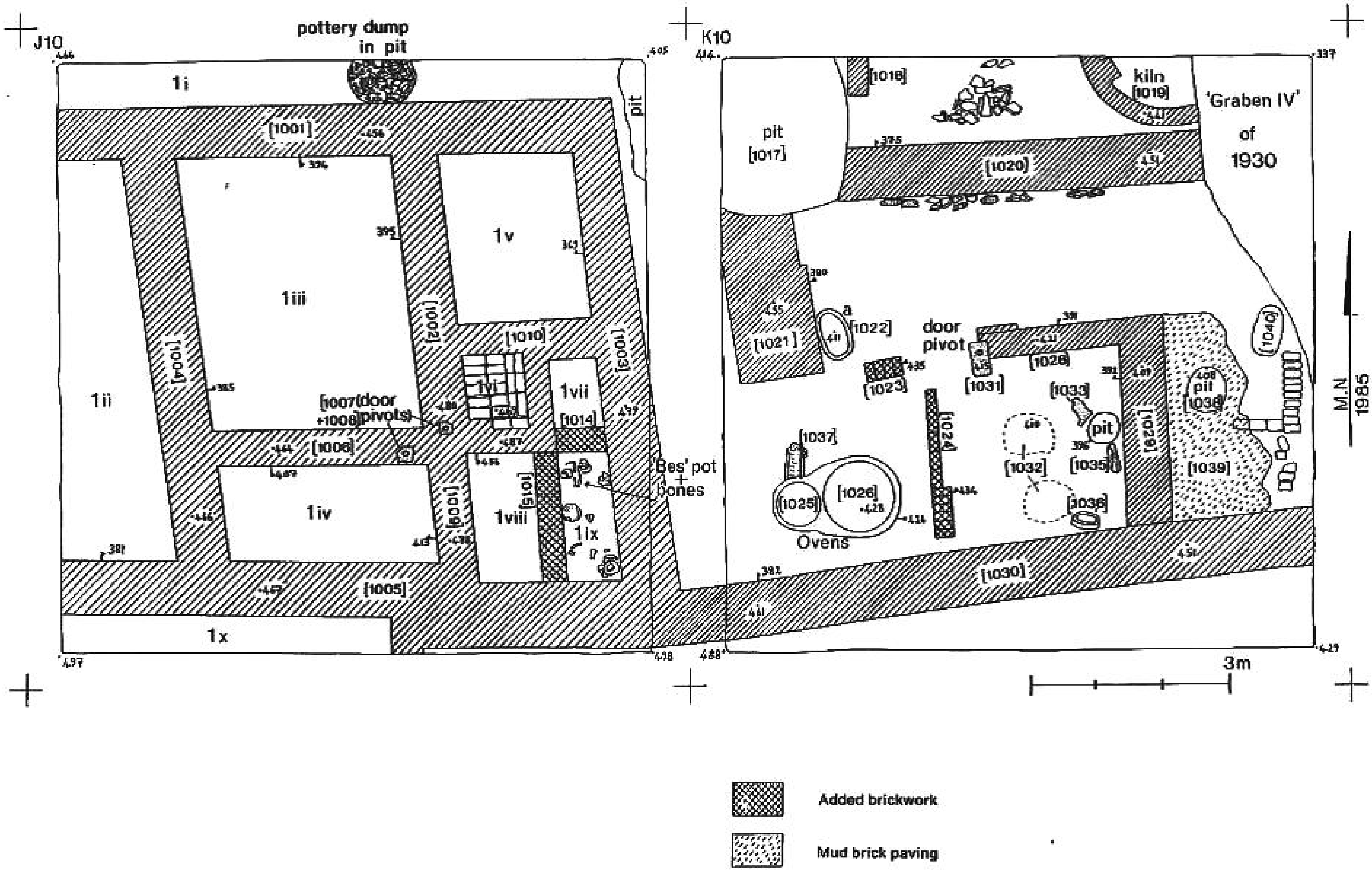


Fig. 4.44. Squares j.10-k.10, level 1b at el-Ashmunein (Spencer 1993, pl. 3)

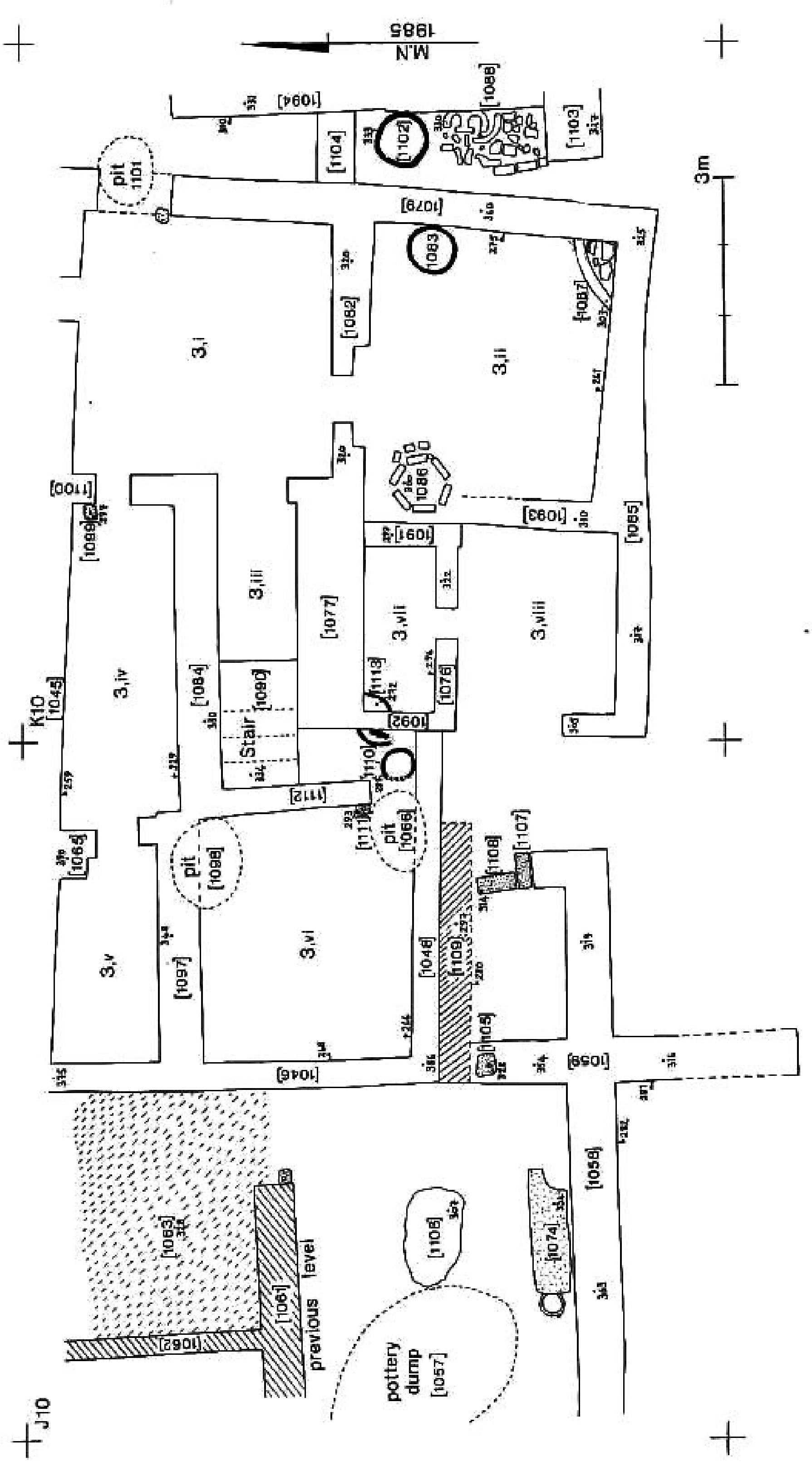


Fig. 4.45. Squares j.10-k.10, level 3 at el-Ashmunein (Spencer 1993, pl. 10)

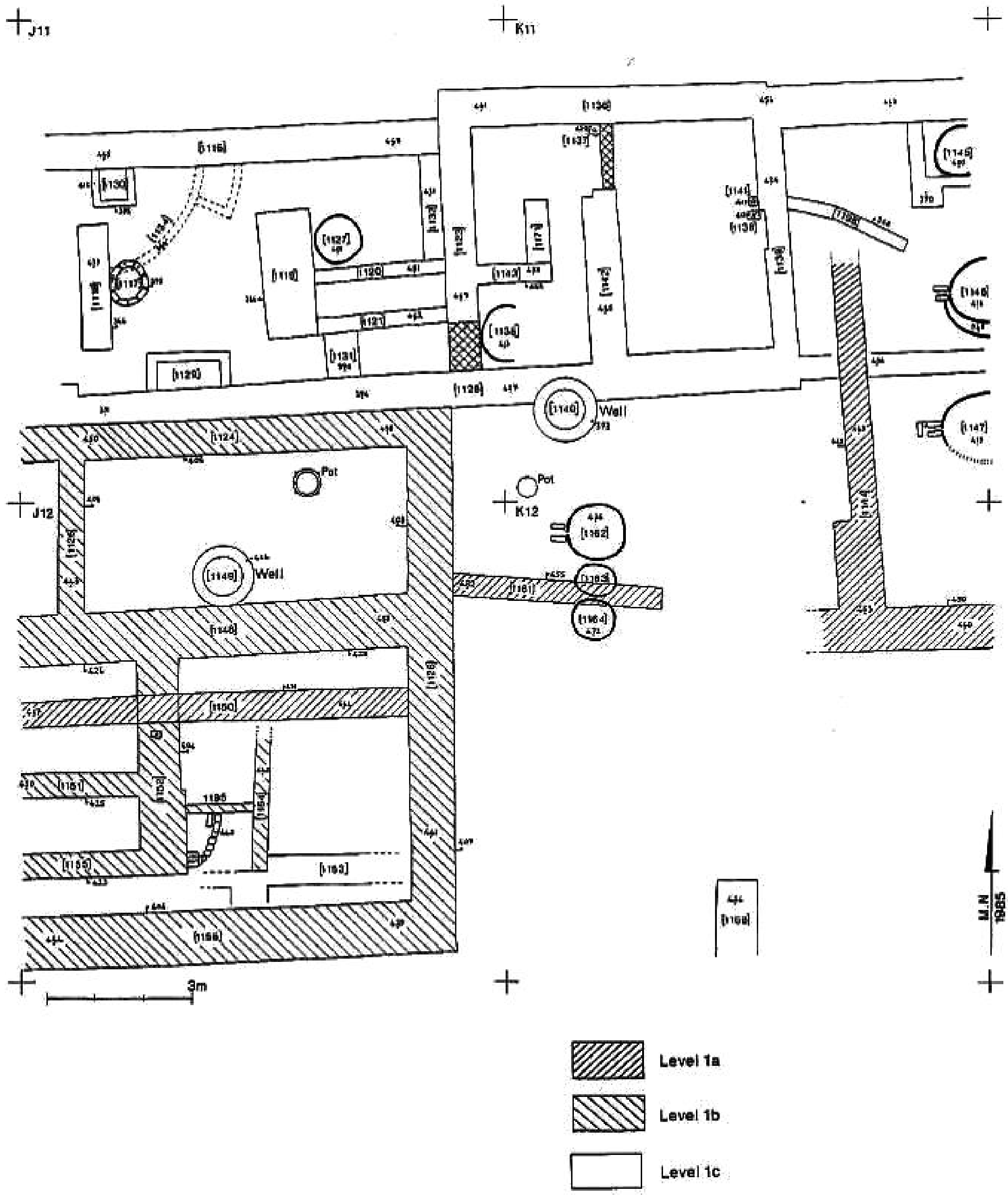


Fig. 4.46. Squares j.11 and k.11 (level 1c, in white) (Spencer 1993, pl. 18)

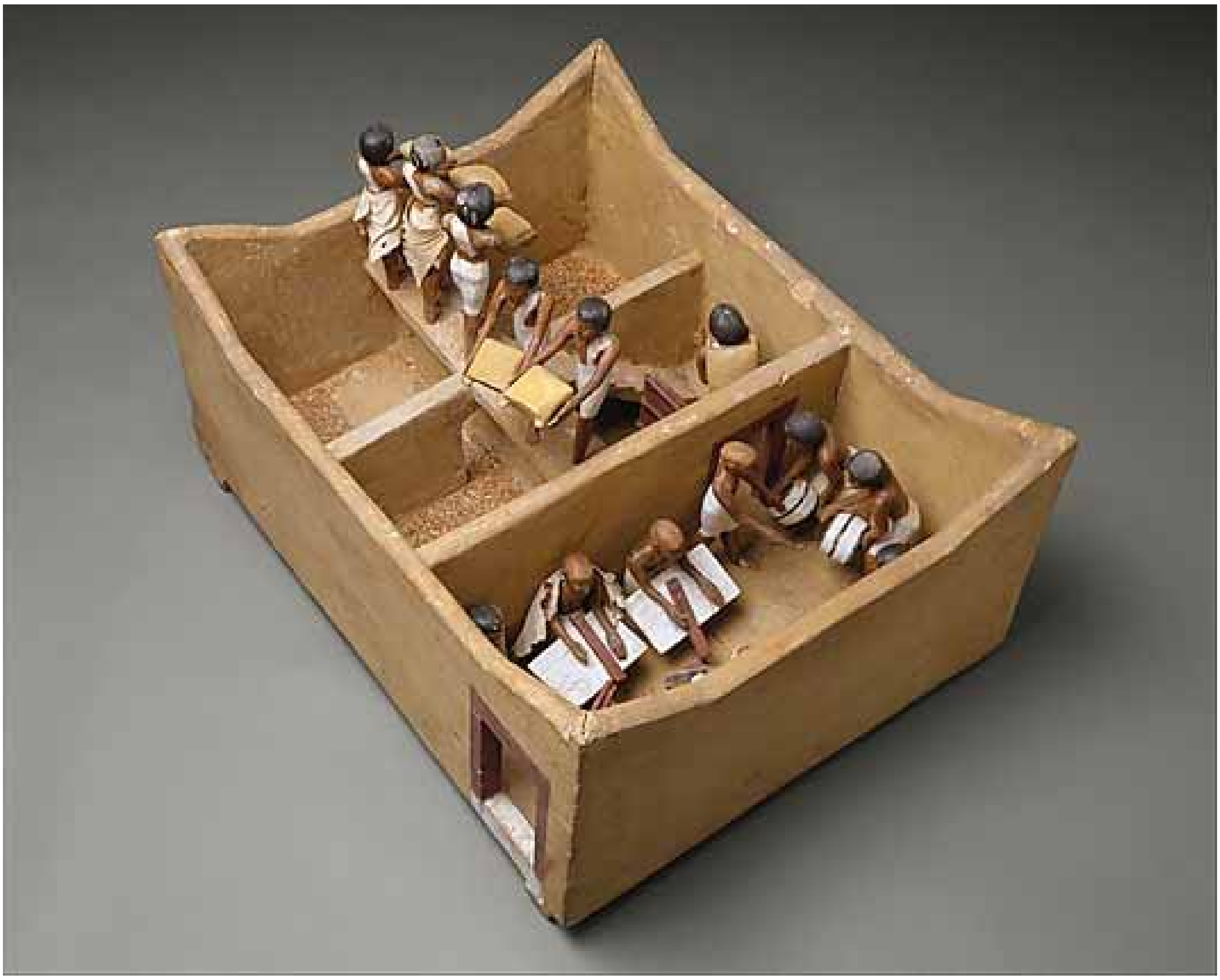
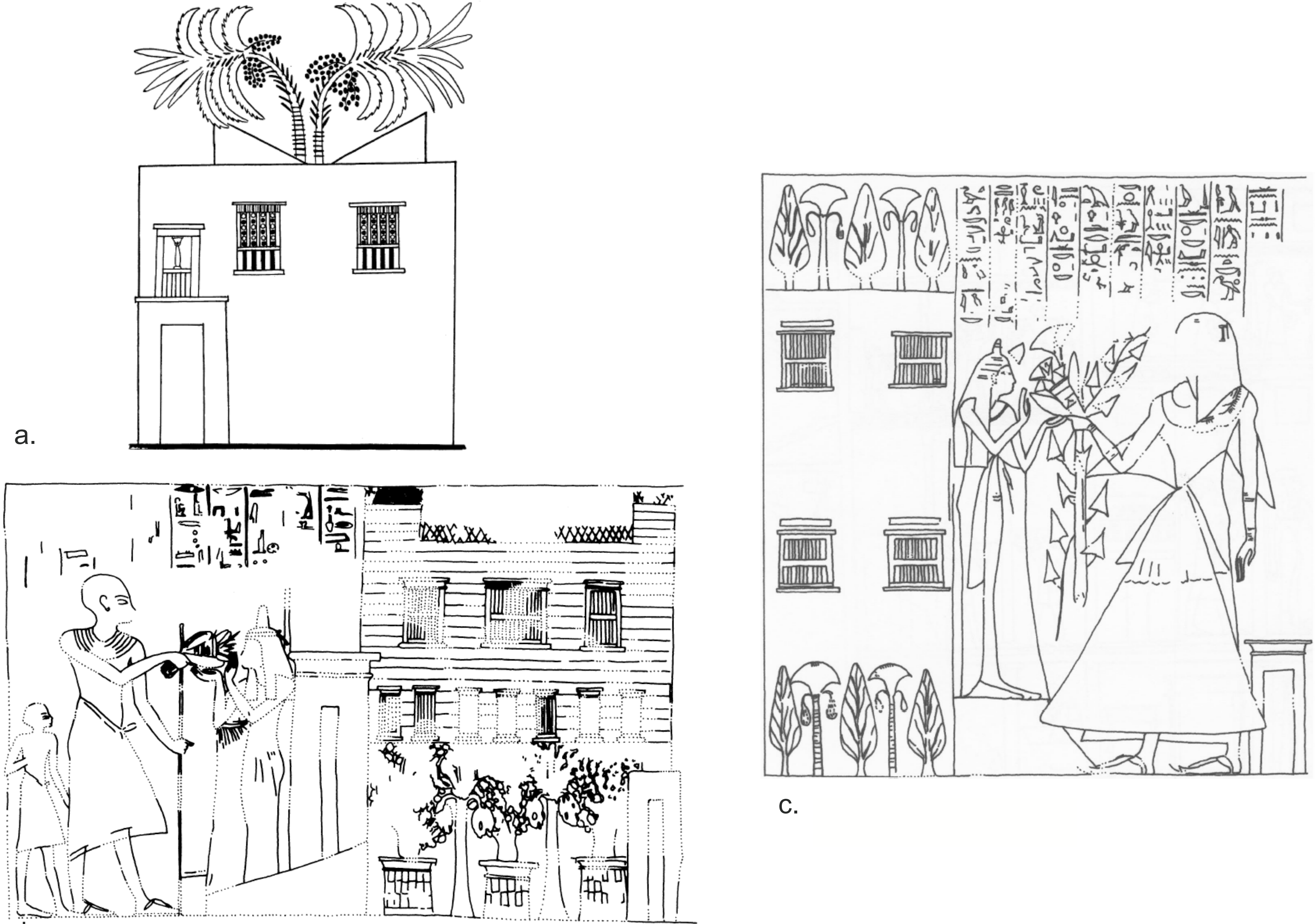


Fig. 4.47. Model of a granary, Tomb of Meketre (12th dynasty, Metropolitan Museum of Art, New York
http://www.metmuseum.org/Collections/search-the-collections/100001753)



a.

b.

c.

Fig. 4.48. Representations of houses in Theban tombs:
a. Theban tomb 90 (Davies 1929, 24)
b. Theban tomb 254 (Davies 1929, 242)
c. Theban tomb 23 (Davies 1929, 243)

Roofs		
Site	**House**	roofs
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	
LISHT - North	A1.3	
	A3.3 phase 2-3	room C: light roof of tamarisk beams and reed (?) room F: sturdier roof plastered on the upper and underside
KAHUN - Mansions	Ricke-1	
	Ricke-2	
KAHUN - Ranks	Rank b	wooden beams with poles on top and bundles of straw or reeds tied to them. Mud plaster inside and outside/ barrel vault
	Rank a	
ELEPHANTINE	H10	
	H12	
	H25b	
	H25a	yard C: vegetal particles (likely light roof)
	H86b	
	H86a	
TELL EL-DABA - F/I	House 5	thick pieces of mud with mat imprints
	House 6	
DEIR EL-BALLAS	House E	alluvial mudbricks/mudbrick rubble with reed and grass impressions; reeds and palm matting and hardened plaster. Remains of acacia beam and traces of others. Room 5: alluvial mudbricks of approximate dimensions 35x16x10cm were found, in addition to rubble mixed with charcoal, wood and bark fragments.
TELL EL-DABA - A/V	House 32-33	
	House 81-83	
	House 92-93	
	House 56-59	
	House 173-176	
MEMPHIS - RAT	7,23	
	3,21	
	2,17,14	
	8,9,22	
	6,24	
	5,19,20,26,27	
AMARNA	Ranefer phase II	Beam casing with painted block pattern, pieces of mud from different areas: marly clay or alluvial mud incl. grit and pebbles and plant material, with impressions of bundles of grass stems/marks of a mat against narrow pole in different arrangements, on one side or both, sometimes remains of upper mud layer (full details in appendix, pp. 413-414).
	Ranefer phase I	
	Q47.23	
	N50.19	
	O49.14	
	N49.6	
	O47.8	
	N51.4	
	P47.6	
	Q46.2	
KARNAK	I	
	II	
	III	
ASHMUNEIN	j11-k11 level 1c	
	j10-k10 level 1b	
	j10-k10 level 3	

Table 4.1.Summary of available information regarding roofs.

Walls

Site	House	colour	dimensions	bonding	thickness	plaster	paint	mortar	mix	others
Giza - Khentkawes Town	House K									
	House E					3-4cm, dark yellow				
	House A									
	House F									
LISHT - North	A1.3									
	A3.3 phase 2-3									southern wall of house in oblique angle
KAHUN - Mansions	Ricke-1									
	Ricke-2									
KAHUN - Ranks	Rank b									
	Rank a									
ELEPHANTINE	H10									
	H12		bricks of wall M42 larger than M57					M57, M68: joints filled with pottery pieces		walls M42, M68: wooden post in corner, its base embedded in masonry bond. M42: Stone slabs against corner.
	H25b					oldest stage: M198, M164, M163, M197. Thick and compact	S of M163: white paint		high proportion of sherd, charcoal and organic tempering	jar seals, large pieces of glass
	H25a									
	H86b									
	H86a									
TELL EL-DABA - F/I	House 5								Ashy, sand-clay	Ph I/3 of N/19: 1 to 3 courses of larger and denser, bluish bricks below wall masonry. Placed between joints of pure sand bricks. In one case, they extended across several houses.
	House 6	Green, yellow and grey	35-37 x 18 x 7-8cm			mud or ground bricks	whitewash	Sandy, filled with pure sand or clay		
DEIR EL-BALLAS	House E								room 5a an area E1: 130cm-deep alluvial mudbrick deposit	E of room 1: 18x24x36 cm slab and limestone block (possible support for staircase)
TELL EL-DABA - A/V	House 32-33				1 brick					
	House 81-83	N(old): green-grey to ochre E: green-grey; W: green-ochre	N (old): 42 x 18-19cm; N(new): 45 x 18-22cm E: 36-37 x 18-19cm; W(old): 43-44 x 18 x 7cm; W(new): 38x18-19cm; S: 40-45x 18-20cm (SW: 48x17 and 42x18; E: 37-38x20; W: 35-38x17-20)		N(old): 2 brick; N(new): 1brick E: 1 brick (prev. 2); W: 1 (prev. 1.5); S: 1.5				N(old): silty; N(new): crumbling; W: silty; S: dense clay (esp SW; E: light, silty; W: silty)	
	House 92-93									
	House 56-59		E, N, S:46-47 x 18-19.	E, N and S: stretchers	E, N and S: 1.5 brick; W: 2				E, N and S: compact, hard clay	E: limestone pounder embedded in crack

Table 4.2.Summary of available information regarding external walls.

Walls

Site	House	colour	dimensions	bonding	thickness	plaster	paint	mortar	mix	others
	House 173-176									
MEMPHIS - RAT	7,23									
	3,21									
	2,17,14									
	8,9,22									
	6,24									
	5,19,20,26,27									
AMARNA	Ranefer phase II									
	Ranefer phase I									
	Q47.23									
	N50.19									
	O49.14									
	N49.6									
	O47.8									
	N51.4									
	P47.6		32-34x16x19		main walls: 1.5					
	Q46.2				S and W perimeter wall: 0.5, regular inner pilasters; other perimeter walls 1.5					
KARNAK	I									
	II									
	III									
ASHMUNEIN	j11-k11 level 1c		35-36x17-18x9-10		wall 1136: 75cm (increases to 85cm after crossing 1139)					
	j10-k10 level 1b									
	j10-k10 level 3		wall 1045:31-33x13-14x6.5-7.5 wall 1046: 37x18x9; wall 1048: 37.5x19x9	wall 1048: stretchers and headers	wall 1046: 42cm; wall 1048: 40cm; S face: added brickwork: 42cm (from attached structure)					wall 1045: preserved to 130cm above foundation

Table 4.2.Summary of available information regarding walls (cont.)

Doors		
Site	House	Doors
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	bricked up doors
LISHT - North	A1.3	imprint of limestone pivot socket
	A3.3 phase 2-3	
KAHUN - Mansions	Ricke-1	half-round stone lintel
	Ricke-2	half-round stone lintel
KAHUN - Ranks	Rank b	
	Rank a	
ELEPHANTINE	H10	part of threshold
	H12	
	H25b	
	H25a	
	H86b	
	H86a	
TELL EL-DABA - F/I	House 5	60-80 cm doorways, limestone pivot sockets with a single or several holes, high thresholds (up to 10cm), some doors bricked up (up to 4 courses); I/20:limestone threshold, stone pivot socket
	House 6	
DEIR EL-BALLAS	House E	W wall of room 2: remains of bricked up doorway
TELL EL-DABA - A/V	House 32-33	95 cm doorway, bricked up; second door at S end of partition: 1,5 brick-thick threshold
	House 81-83	
	House 92-93	
	House 56-59	
	House 173-176	
MEMPHIS - RAT	7,23	limestone threshold with pivot socket
	3,21	
	2,17,14	level II b: unusually wide, no conventional doorway
	8,9,22	room 8: limestone threshold with pivot socket; room 9, level II: inscribed lintel lector-priest of Ptah, Sethnakht (both probably from room 9 door). Possible portico (?)
	6,24	
	5,19,20,26,27	
AMARNA	Ranefer phase II	Entrance with steps, full width 2.17m, narrow ramp on either side
	Ranefer phase I	limestone threshold, 4 narrow rectangular limestone slabs and two smaller infill pieces, side slabs with raised edges and circular pivot socket; smears of red paint (jamb location?). Area of wall behind jambs covered with thick mud plaster with whitewash traces. Entrance with some steps
	Q47.23	
	N50.19	NW wall, buttressed at either side of door on the inside
	O49.14	
	N49.6	
	O47.8	
	N51.4	limestone threshold, remains of ashlar frame (acting as external doorsteps on the outer wall). Doorway buttressed inside at either side
	P47.6	small notches on the outside and lower brick wall supporting an absent threshold
	Q46.2	limestone threshold with pole traces, a pivot hole and friction marks from wooden door; steps: 7 cm at 45 cm slope, narrow ramp surface at either side.
KARNAK	I	sandstone doorway, 75cm wide x 110cm deep, limestone threshold, jambs with inscribed hieroglyphs, 18cm thick slab lintel, with two dovetails, ring cut into the stone.
	II	Jambs without inscriptions, human figure. Door opening: 65cm wide x80cm thick, frame and jambs made of slim slabs fixed with plaster. Same fixing for lintel as I
	III	threshold
ASHMUNEIN	j11-k11 level 1c	
	j10-k10 level 1b	
	j10-k10 level 3	room 3i: 103cm wide doorway, piece of limestone to south side in the place of pivot socket but without one.

Table 4.3.Summary of available information regarding external doors.

Windows		
Site	**House**	**Windows**
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	
LISHT - North	A1.3	
	A3.3 phase 2-3	
KAHUN - Mansions	Ricke-1	
	Ricke-2	
KAHUN - Ranks	Rank b	
	Rank a	
ELEPHANTINE	H10	
	H12	
	H25b	
	H25a	
	H86b	
	H86a	
TELL EL-DABA - F/I	House 5	
	House 6	
DEIR EL-BALLAS	House E	
TELL EL-DABA - A/V	House 32-33	
	House 81-83	
	House 92-93	
	House 56-59	
	House 173-176	
MEMPHIS - RAT	7,23	
	3,21	
	2,17,14	
	8,9,22	
	6,24	
	5,19,20,26,27	
AMARNA	Ranefer phase II	
	Ranefer phase I	
	Q47.23	
	N50.19	
	O49.14	
	N49.6	
	O47.8	
	N51.4	
	P47.6	
	Q46.2	
KARNAK	I	
	II	
	III	
ASHMUNEIN	j11-k11 level 1c	
	j10-k10 level 1b	
	j10-k10 level 3	

Table 4.4.Summary of available information regarding external windows

Others		
Site	**House**	**others**
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	
LISHT - North	A1.3	
	A3.3 phase 2-3	S wall: small storage bin full of grain
KAHUN - Mansions	Ricke-1	
	Ricke-2	
KAHUN - Ranks	Rank b	
	Rank a	
ELEPHANTINE	H10	
	H12	
	H25b	
	H25a	
	H86b	
	H86a	
TELL EL-DABA - F/I	House 5	
	House 6	
DEIR EL-BALLAS	House E	
TELL EL-DABA - A/V	House 32-33	
	House 81-83	
	House 92-93	
	House 56-59	
	House 173-176	storage constructions between houses
MEMPHIS - RAT	7,23	
	3,21	
	2,17,14	
	8,9,22	
	6,24	
	5,19,20,26,27	
AMARNA	Ranefer phase II	
	Ranefer phase I	
	Q47.23	
	N50.19	
	O49.14	
	N49.6	b: covered oven against perimeter
	O47.8	
	N51.4	
	P47.6	mastaba. Between main house and perimeter, NE side: fragments of a round oven.
	Q46.2	NW corner of Q 46.2. yard: series of ovens, close to ovens from 46.1. Round furnace walls made of baked clay and protected by a coat of mudbricks, with air inlet openings.
KARNAK	I	
	II	
	III	
ASHMUNEIN	j11-k11 level 1c	
	j10-k10 level 1b	
	j10-k10 level 3	outside 3i, eastern side: 2 mud storage bins, part of a kiln, clay oven

Table 4.5.Summary of available information regarding other external features

Ceilings

Site	House	Ceilings
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	
LISHT - North	A1.3	chamber (n): remains of vault
	A3.3 phase 2-3	
KAHUN - Mansions	Ricke-1	
	Ricke-2	
KAHUN - Ranks	Rank b	
	Rank a	9x9x2.4cm wooden beam with marks across/ barrel vault
ELEPHANTINE	H10	
	H12	
	H25b	
	H25a	
	H86b	
	H86a	
TELL EL-DABA - F/I	House 5	
	House 6	
DEIR EL-BALLAS	House E	room 5a: 6x6cm semicircular fragment of acacia bark with marl mortar. 1.8m acacia beam (12-14cm diam.)
TELL EL-DABA - A/V	House 32-33	
	House 81-83	
	House 92-93	
	House 56-59	
	House 173-176	
MEMPHIS - RAT	7,23	
	3,21	
	2,17,14	
	8,9,22	
	6,24	
	5,19,20,26,27	
AMARNA	Ranefer phase II	
	Ranefer phase I	(full details in app. pp. 416-417): fragments of mud plaster, mainly white or pink-brown, designs, some with marks of narrow wooden poles or grass bundles, separate mud layer; beam fragments, some of them with paint (and re-paint) traces.
	Q47.23	
	N50.19	
	O49.14	
	N49.6	
	O47.8	
	N51.4	
	P47.6	
	Q46.2	
KARNAK	I	
	II	
	III	
ASHMUNEIN	j11-k11 level 1c	
	j10-k10 level 1b	
	j10-k10 level 3	

Table 4.6.Summary of available information regarding ceilings

Internal Walls

Site	House	colour	dimensions	bonding	thickness	plaster	paint	mortar	mix	others
Giza - Khentkawes Town	House K									
	House E	reddish (later repairs)								room 71:pilasters forming niche
	House A									
	House F						whitewashed, black		silty	room 129:pilasters forming niche
LISHT - North	A1.3					room h	room h, f and entrance doorway: up to 85cm in black, then yellow, separated by white line			room h: preserved to 170 cm
	A3.3 phase 2-3					room e: unpainted plaster	room b: black and yellow separated by black, white, red and brown stripes			some walls preserved up to 270 cm
KAHUN - Mansions	Ricke-1									
	Ricke-2									
KAHUN - Ranks	Rank b									
	Rank a		28-30 x 12.5-15 x 7.5-10			smooth layer of mud	most imp rooms: dado: lower 90-150cm black or dark, upper part yellow, separated by red lines on white background Designs of 4 jars on wooden stand & house front: red, yellow and white.			wooden cramps for stonework
ELEPHANTINE	H10							side joints reinforced		
	H12		M62: smaller than other walls			M62, M63: good quality	M63: painted yellow rectangle 20-52cm above ground, 37cm wide			
	H25b					E of M114				
	H25a									
	H86b	M848, 889, 953, 867, 906, 963 and 964: grey. Rest: yellow				B and C: corners plastered with mud (round)			M848, 889, 953, 867, 906, 963 and 964: Muddy. Rest: Sandy	up to 5cm finger impression on bricks. B and C: covered with stone slabs (in situ at M953, inserted in the wall; M852 and 883: placed over wall).
	H86a				1.5 brick					
TELL EL-DABA - F/I	House 5					ground bricks, clay/sand plaster				
	House 6									some blackened walls
DEIR EL-BALLAS	House E									
TELL EL-DABA - A/V	House 32-33		41x20 (38x18 cm foundation)		1 (1.5 foundation)					
	House 81-83									
	House 92-93									
	House 56-59									
	House 173-176									
MEMPHIS - RAT	7,23									
	3,21				1 brick					
	2,17,14									

Table 4.7.Summary of available information regarding internal walls

Internal Walls

Site	House	colour	dimensions	bonding	thickness	plaster	paint	mortar	mix	others
	8,9,22									
	6,24									
	5,19,20,26,27									
AMARNA	Ranefer phase II					room 15 and 16: rich in straw. Unknown location: plaster painted white (cavetto cornice?).	rooms 5 and 5a: white, red, hieroglyphs and people; rooms 15 and 16: yellow with hieroglyphs and designs in black and red; red and white on yellow background; blue over white yellow background with white,red and pink designs; yellow background with reddish-brown Fragments (unknown location): main face concave with thin black edge and traces of white on upper edge; on the other face, yellow over earlier white and blue (cavetto cornice?)	Room 10: vertical space, six course-high of mortar fill; block of alluvial mud mixed with grit and pebbles: top surface retained layer of mud mortar pats (balls used as mortar)		N wall of transverse hall: not uniform, vertical joint through brickwork; 65cm wide, 1 brick deep vertical niche. Square wooden beam: 80cm long and 17cm broad. Rooms 5 and 5a, N wall and SE corner: false door niches; W of room 1: 120x80x15cm niche. Plastered, different colours, hieroglyphs and people. 6.5 cm diam. beam
	Ranefer phase I				W of A7: not uniform, steps inwards at least 15cm; A8: wall thickened towards the W.	A16: E of divide with A15: patch of whitewash on mud plaster in its southwest corner				A17 and A15, S of A16, eastwards from dividing wall with A15: brick self supports on southern wall. A8: 1 brick thick dais framed with brick on edge, layer of straw-rich mud plaster and angle-chopped end
	Q47.23		cluster b: 33x17x9cm	room 14 cluster c, Q47.23a and 2nd group of cluster b: 1 (all others: 0.5)						room 14 cluster c: pilasters forming niches
	N50.19		30x16x8	0.5	convex mud plaster rich in straw (cavetto cornice?)					

Table 4.7.Summary of available information regarding internal walls (cont.)

Internal Walls										
Site	House	colour	dimensions	bonding	thickness	plaster	paint	mortar	mix	others
	O49.14		32x16x9							
	N49.6		clusters a and c: 33x16x8, clusters b and e: 35x17x9							
	O47.8				cluster b: 0.5					cluster b: reinforced with brick pillars in wall corners and door openings. Room 14: alcove
	N51.4		Square room: 31x15x9		all walls: 1	deep hall, NE, SE and SW walls of broad hall, S wall of hall:mud plaster; square room: white plaster. Hallways and bedrooms: no trace of plaster				preserved to c. 50cm
	P47.6									bedroom alcove
	Q46.2				first antechamber, walls between the three-strip plan and two halls: 1.5					first antechamber, walls between the three-strip plan and two halls: survived to c. 150cm; SW bedroom: deep alcove, 3 low walls up to 78cm
KARNAK	I				room J: thicker at the top	rooms C and D: white plaster				NE corner of room D: aligned recesses of 6cm diameter, 1 m from ground
	II									
	III									
ASHMUNEIN	j11-k11 level 1c	1120, 1121 and 1119:dark grey	1139 and 1128: 30-31x15-16x8-9	1120, 1121: stretchers and headers	1120, 1121: 1brick 1123: 65cm 1142: 75cm 1128: 75-90-50;				sandy	E face of 1139 to middle of room: curved wall of single course of headers
	j10-k10 level 1b				1028-1029: 31x15x9.5					N and W walls of chamber 1, ix, founded at less depth than surrounding ones. Walls 1028-1029 preserved to 3-4 courses
	j10-k10 level 3		1084 and 1097: 33-34x16x7.5; 1076:31-32x14x2.5		1084:60cm; 1077: 95cm; wall 1076 (rooms 3vii-viii): 30cm					

Table 4.7.Summary of available information regarding internal walls (cont.)

Internal Doors		
Site	**House**	**Internal doors**
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	
	House D	bricked up doors
	House C	
LISHT - North	A1.3	SW of hall (h): limestone doorframe
	A3.3 phase 2-3	room b-c: bricked up
KAHUN - Mansions	Ricke-1	
	Ricke-2	
KAHUN - Ranks	Rank b	all: arched, limestone chips between bricks; wooden doors, single and double door bolts (full details in app. page 399), wooden key, wooden threshold with pivot socket or separate stone pivot socket. Remains of leather in socket
	Rank a	
ELEPHANTINE	H10	room A-C corridor: stone pivot socket; A: flagstone as threshold
	H12	room D: wooden threshold, stone pivot socket
	H25b	room D: stone threshold. Rooms C- F: rough red granite thresholds (?)
	H25a	
	H86b	space H-K: 11x6cm plastered recess (timber jamb gap?)
	H86a	room F-G: brick threshold with steps, difference in level
TELL EL-DABA - F/I	House 5	phase I/2: threshold; phase I/1: stone pivot socket, bricked up doors, o/20: stone pivot socket
	House 6	
DEIR EL-BALLAS	House E	
TELL EL-DABA - A/V	House 32-33	
	House 81-83	room 81-82: limestone pivot socket
	House 92-93	
	House 56-59	
	House 173-176	
MEMPHIS - RAT	7,23	
	3,21	
	2,17,14	
	8,9,22	
	6,24	2 limestone door jambs
	5,19,20,26,27	
AMARNA	Ranefer phase II	limestone threshold, bottom blocks of limestone door jambs; transverse hall: stone double doorway with painted brick false door. Room 10: limestone threshold, single slab with pivot socket. Blocked doorway. Rooms 11 and 12: limestone thresholds: two or three slabs with pivot socket. Room 13: 3 slabs, separate slab with pivot hole and bottom of jamb (?). Room 17: limestone threshold. Rooms 5 and 5a: single limestone socket.
	Ranefer phase I	Central hall: limestone threshold. South chamber: coated with gypsum, single pivot socket, white and red paint. Room 4: two limestone thresholds, one of them with an obvious pivot socket. Slabs with pivot sockets: A1 and A10, between A2 and A4, between A2 and A15 (two slabs, only one with pivot socket). End of a slab: between A4 and A16; end of a threshold between A1 and A11. In A8 there was a brick threshold.
	Q47.23	b: NE wall, chamber 1: limestone fitting; c: plastered plaques with round edges; brick pilasters
	N50.19	
	O49.14	
	N49.6	
	O47.8	
	N51.4	Broad and deep hall: limestone threshold with traces of wooden door jambs and pivot socket.
	P47.6	Deep hall: limestone plaster, mark of stone post, lower pivot socket.
	Q46.2	Deep hall: threshold, plain jambs with notches
KARNAK	I	stone doorway: 65cm wide, 75cm deep and 162cm high; hall b: framed with pieces of stone 15x19cm fixed to wall with mud mortar; room J: stone paved doorway. Access to room E: walled door
	II	yard: moulded stone frame door
	III	
ASHMUNEIN	j11-k11 level 1c	bricked up door in wall 1123; limestone pivot block S of wall 1136. 2 pivot blocks W of wall 1139 with multiple holes.
	j10-k10 level 1b	j10: 2 limestone pivot sockets, pierced on both sides. 1 pivot socket underneath, only pieced on one side (more details in app. page 429); k10: limestone pivot
	j10-k10 level 3	3i-3iv: 50cm wide doorway, limestone pivot socket to N jamb. 3iv-3v: fragment of worked stone without a recess, southern jamb. 3vi-3iii: limestone pivot block

Table 4.8.Summary of available information regarding internal doors

Internal Windows		
Site	**House**	**Internal windows**
Giza - Khentkawes Town	House K	
	House E	
	House A	
	House F	
LISHT - North	A1.3	S room (n): small opening in lower portion of vault; N rooms (b-c) and (d): slanting windows 3 m up
	A3.3 phase 2-3	dividing wall b-c: wooden bar of small window
KAHUN - Mansions	Ricke-1	
	Ricke-2	
KAHUN - Ranks	Rank b	
	Rank a	
ELEPHANTINE	H10	
	H12	
	H25b	
	H25a	
	H86b	
	H86a	
TELL EL-DABA - F/I	House 5	
	House 6	
DEIR EL-BALLAS	House E	
TELL EL-DABA - A/V	House 32-33	
	House 81-83	
	House 92-93	
	House 56-59	
	House 173-176	
MEMPHIS - RAT	7,23	
	3,21	
	2,17,14	
	8,9,22	
	6,24	
	5,19,20,26,27	
AMARNA	Ranefer phase II	
	Ranefer phase I	
	Q47.23	
	N50.19	
	O49.14	
	N49.6	
	O47.8	
	N51.4	
	P47.6	
	Q46.2	
KARNAK	I	
	II	
	III	
ASHMUNEIN	j11-k11 level 1c	
	j10-k10 level 1b	
	j10-k10 level 3	

Table 4.9.Summary of available information regarding internal windows

Internal Others

Site	House	Floors	Columns	Ovens, hearths and kilns
Giza - Khentkawes Town	House K	129, 130, N133: 40cm raised, limestone (?)		S130: oven
	House E			E69: hearths
	House A			
	House D			
	House C			mud fireplace
	House F			
LISHT - North	A1.3		hall (h): marks of pillars	
	A3.3 phase 2-3	room e:large, flat fired bricks, evidence of whitewash with fine sand layer and mud floor above	room b-c: shallow pits	
KAHUN - Mansions	Ricke-1		Wide and flat bases,. House 5: lower part of wooden octagonal column, also stone octagonal column (8-ribbed or 16-fluted); capitals: plain abaci or brackets.	
	Ricke-2	Clay layer		
KAHUN - Ranks	Rank b		Stone bases, 51-61cm bottom, 43-53 top. Octogonal marks wooden column Bottom diam: c. 25.5	
	Rank a	Clay layer		
ELEPHANTINE	H10		Octagonal pink mortar (?)	
	H12			
	H25b			A: oval hearth and previous oven
	H25a			F:remains of furnace with standing stone slabs, previous burnt bricks (previous identical use)
	H86b	room F: eight tiles of compact floor		
	H86a	E: footprints on mud surface		
TELL EL-DABA - F/I	House 5	Pounded sand/clay. House 2, 3: all rooms with brick rubble pavement; house 4: paved area		main room (j/21): furnace in corner; courtyard (o/20): bread oven with plate and bread moulds
	House 6			
DEIR EL-BALLAS	House E	room 5a, SE corner of E wall, room 2, S corner of E1, S section of E2: plaster floor (3 parts: mud plaster with small pebbles, marl plaster with small pebbles, deep layer of gypsum and gypsum mixed with fine sand	room 5a: limestone column base. Room 3: 3 bases (2 pierced, 1 rectangular bone inlay)	
TELL EL-DABA - A/V	House 32-33			
	House 81-83			
	House 92-93			
	House 56-59			
	House 173-176			
MEMPHIS - RAT	7,23	brick-paved yard		

Table 4.10.Summary of available information regarding other internal features (floors, columns and heating devices)

Internal Others

Site	House	Floors	Columns	Ovens, hearths and kilns
	3,21			
	2,17,14			
	8,9,22	brick-paved yard		
	6,24			
	5,19,20,26,27	level III: rear of yard: brick-lined oven /fire jar		
AMARNA	Ranefer phase II	entrance hall, transverse hall, central hall, rooms 13, 15 and 16: brick floor. Rooms 5 a 5a: brick floor and mud plaster	Transverse hall: 2 limestone bases, with square brick piers; central room: 2 halves of column, concentric circular depression; entrance hall: shallow recess; central hall: large column base (2 joined halves) with small circle in centre; room 5: bricks in arc, support-pier of bricks; room 15: large base (more details app. page 421-422)	
	Ranefer phase I	entrance hall: mud plaster over mudbricks. Ante-room: hard mud plaster, traces of pattern. Transversal hall, central hall, A17, room A4, A16 and A8: bricks coated with mud plaster. A7: mudbrick floor and no plaster. A14: mud surface. A5: mud plaster.	Transverse hall: Column base, hole with gypsum edge.	
	Q47.23	b: thick mud layer		room 13: coated oven
	N50.19			
	O49.14			cluster 2, courtyard 7, W corner: small, round brick.
	N49.6	c (19) and f (36/37): steps		b: courtyard, E corner: covered oven.
	O47.8	thick mud layer		
	N51.4	hallways and bedrooms: brick paved; all others: mud layer	Deep hall: limestone base, central column	
	P47.6	deep hall: remains of brick paving		corridor between main house and surrounding wall: round oven (external)
	Q46.2	bedroom 14, first hall, deep hall, square room, corridor to side and outer rooms: paved with bricks. All others: thick mud layer. Rooms 2, 3 of farmyard: plastered.	Entrance hall: limestone base and round wooden shaft. Large hall: limestone base and traces. Deep hall: central column	NW corner of yard: series of ovens. Round furnace walls made of baked clay, protected by coat of mudbricks, with air inlet openings
KARNAK	I		courtyard, to the left	
	II		S part of yard: 2 sandstone columns	
	III	kitchen/storage paved with irregular stones		courtyard E, kitchen.
ASHMUNEIN	j11-k11 level 1c			98 cm diam oven, built over remains of earlier one. 2 circular brick hearths, over the remains of a large silo. Ovens built on top of each other, surrounded by mudbricks.36cm high. Pottery trays. Diam between 90 and 140cm, 3 mudbricks surrounding the aperture in front.

Table 4.10.Summary of available information regarding other internal features (floors, columns and heating devices) (cont.)

Internal Others

Site	House	Floors	Columns	Ovens, hearths and kilns
	j10-k10 level 1b	chamber 1,vi: mudbrick paving, bricks laid flat on 2 courses; patches of white plaster flooring W of wall 1029 and mud brick flooring E of wall 1029		2 ovens built over previous (113cmx42 and 70cm); kiln on NE corner, 52cm high, 13cm deep, 34cm wide. Side 1 brick-length across
	j10-k10 level 3	stamped mud floor		East: kiln associated with brickwork. Rooms 3ii: circular brick-lined hearth, E: 70cm diam. clay oven; SE corner bricked forming hearth with pottery tray

Table 4.10.Summary of available information regarding other internal features (floors, columns and heating devices) (cont.)

Internal Others			
Site	**House**	**Staircases**	**Mastabas**
Giza - Khentkawes Town	House K		
	House E		
	House A		
	House D		
	House C		
	House F		
LISHT - North	A1.3	corridor e: unspecified	
	A3.3 phase 2-3	suggested but no evidence provided, SE room c: stepped structure (?)	
KAHUN - Mansions	Ricke-1		
	Ricke-2		
KAHUN - Ranks	Rank b	dog-legged, 5-6 steps/flight, 63.5-71cm per step	
	Rank a		
ELEPHANTINE	H10		
	H12		
	H25b		
	H25a		
	H86b		
	H86a		
TELL EL-DABA - F/I	House 5		

Table 4.10.Summary of available information regarding other internal features (staircases, mastabas) (cont.)

Internal Others

Site	House	Staircases	Mastabas
	House 6		
DEIR EL-BALLAS	House E	room E1: 5 steps (tread 20cm, rise 14cm), SW corner of courtyard: from prints of bottom two steps in the stairway and in the courses of bricks at the level of the bottom step + protuberance on floor where the plaster was smoothed up against the stairway and the crosswall. E1-E3 (?)	
TELL EL-DABA - A/V	House 32-33		
	House 81-83		bench running parallel to N wall
	House 92-93		NE corner of 092: 181x99cm, 1 brick thick, bricks 34-35x8-10cm
	House 56-59		
	House 173-176		
MEMPHIS - RAT	7,23		
	3,21		
	2,17,14		
	8,9,22		
	6,24		
	5,19,20,26,27		
AMARNA	Ranefer phase II		
	Ranefer phase I		Central hall, rear wall and possibly E wall
	Q47.23	d and b: first steps	b: corner of room S-6; d: NE main living room, limestone
	N50.19		
	O49.14		cluster 1: NW main living room
	N49.6	a (6), b (13), e (30): brick on edge steps	b: living room, in front of SW wall; f: main living room, NW wall.
	O47.8	Deep hall: brick on edge steps, 25-30cm gradient in lower section	SW of deep hall

Table 4.10.Summary of available information regarding other internal features (staircases, mastabas) (cont.)

Internal Others

Site	House	Staircases	Mastabas
	N51.4	Deep hall: bricks on edge; space underneath accessible from opening; room 13: brick on edge and flat bricks.	SW of deep hall, between doors leading to side rooms
	P47.6	11 and 13: bricks on edge.	
	Q46.2	first antechamber and middle ground strip: lower levels filled with mud plaster, imprint of logs.	Deep hall: in front of back wall Square room
KARNAK	I	courtyard: first steps	
	II	corridor e: a stone step, marks of steps on the wall	
	III	south section (house VI): some steps	
ASHMUNEIN	j11-k11 level 1c		
	j10-k10 level 1b		
	j10-k10 level 3	Upper surface of brick stairway, with brick on edge forming steps. Fire bricks beside wall 1044	

Table 4.10.Summary of available information regarding other internal features (staircases, mastabas) (cont.)

Internal Others

Site	House	underground silos	silos and bins	buried pots/holes	small containers	magazines
Giza - Khentkawes Town	House K					
	House E		near entrance door: 4/5 circular bins made with small bricks			
	House A					
	House F					
LISHT - North	A1.3		corner of courtyard: bin			
	A3.3 phase 2-3					
KAHUN - Mansions	Ricke-1					
	Ricke-2					
KAHUN - Ranks	Rank b					
	Rank a		conical bins, built with single bricks laid on their sides, mud-plastered on both sides. Often in pairs; one case: grain-floor by side of granary with slabs of stone and raised border		mud container with small holes and sliding door	
ELEPHANTINE	H10	middle of courtyard: small circular storage				
	H12					
	H25b					
	H25a	oval pit with large number of seals	W of courtyard: square brick structure with remains of wooden frame			
	H86b		NE of courtyard: two silos, floor made of sandstone slabs, plastered on all sides. Inner walls of one with standing stone slabs, partly integrated into masonry. Outside: coating of mud high in straw, one with ash.			
	H86a		2 small structures + mud-plastered rectangular silo			
TELL EL-DABA - F/I	House 5		houses S of alley: small silo			
	House 6		SE of courtyard (replacing houses 6-8): silo	courtyard: rectangular pit		
DEIR EL-BALLAS	House E		N wall of room 5a: 105x75 brick bin (c.22x15x10cm bricks)			

Table 4.11.Summary of available information regarding storage

Internal Others

Site	House	underground silos	silos and bins	buried pots/holes	small containers	magazines
TELL EL-DABA - A/V	House 32-33			close to 33: amphora base buried 15cm into ground; room 032:28cm inner diameter, 65cm total diameter circular mudbrick pit		
	House 81-83			near main entrance: small pit with remains of two vases		
	House 92-93					
	House 56-59	5-brick diameter, circular				
	House 173-176					
MEMPHIS - RAT	7,23					
	3,21					
	2,17,14		SW: circular bin; silo on bed of limestone fragments			
	8,9,22		room 9: brick silo; room 8: mud container		room 8, NW corner: square bench + ceramic object	
	6,24					
	5,19,20,26,27					
AMARNA	Ranefer phase II					
	Ranefer phase I		A5: 2 circular granaries, external diam 245cm	room 5: 2 sets of circular impressions		
	Q47.23			rooms 16-18: buried pots, protected edges		
	N50.19					
	O49.14	brick walls, filled with process fragments of alabaster and slate		room 2: large, half-buried pitcher; several small pits in ground		
	N49.6	b, room 10: flat, rectangular pit lined with bricks				
	O47.8			Broad hall and large hall: buried pots		
	N51.4					

Table 4.11.Summary of available information regarding storage (cont.)

Internal Others

Site	House	underground silos	silos and bins	buried pots/holes	small containers	magazines
	P47.6			Deep hall: vessel marks (one pot survived in front of SW wall); hallway: pot mark with residues of ash		
	Q46.2					
KARNAK	I			kitchen/storage area: vessel support and large jar buried into ground		storage under staircase
	II					
	III					
ASHMUNEIN	j11-k11 level 1c	NW corner of 1116 against S wall:curved out wall of silo, 1 brick thick	NW corner of 1116 against S wall: small bin on ruins of silo (87x80cm deep, 2 courses of brick); N side of wall 1128: brick bin, 1 brick thick, with ash fill underneath.			
	j10-k10 level 1b		Wall 1020: brick bin; small piece of brickwork filled with mixed shards		Brickwork block with several pottery vessels; one of them with carbonised wheat. 2 parallel side walls (30cm thick each) separated by space 60cm wide x 140cm long. Bricks: 30x15-16x9.5cm; associated plates and limestone weight.	
	j10-k10 level 3					

Table 4.11.Summary of available information regarding storage (cont.)

Site	Period	House	Usable floor area
Giza - Khentkawes Town	Old Kingdom	House K	140.78
		House E	88.08
		House A	75.16
		House F	85.04
LISHT - North	Middle Kingdom	A1.3	144.88
		A3.3 phase 2-3	79.68
KAHUN - Mansions	Middle Kingdom	Ricke-1	1619.32
		Ricke-2	1572.46
KAHUN - Ranks	Middle Kingdom	Rank b	125.8
		Rank a	87.32
ELEPHANTINE -	Middle Kingdom	H10	92.79
		H12	30.77
		H25b	75.02
		H25a	77.8
		H86b	171.94
		H86a	170.56
TELL EL-DABA - F/I	Middle Kingdom	House 5	20.61
		House 6	20.91
DEIR EL-BALLAS	Second Intermediate P	House E	217.46 min
TELL EL-DABA - A/V		House 32-33	12.63 min
		House 81-83	52.74
		House 92-93	24.33
		House 56-59	27.99
		House 173-176	29.67 min
MEMPHIS - RAT	**New Kingdom**	7,23	41.17 min
		3,21	50.33 min
		2,7,14	25.65 min
		8,9,22	33.71 min
		6,24	25.37
		5,19,20,26,27	29.58
AMARNA	**New Kingdom**	Ranefer phase II	200.75
		Ranefer phase I	121
		Q47.23	452.52
		N50.19	39.06
		O49.14	77.18
		N49.6	251.51
		O47.8	452.52
		N51.4	359.791
		P47.6	224.22
		Q46.2	1419.33
KARNAK	**Third Intermediate P**	I	96.05
		II	77.22
		III	103.75
ASHMUNEIN	**Third Intermediate P**	j11-k11 level 1c	25.37 min
		j10-k10 level 1b	31.61 min
		j10-k10 level 3	60.52
total number of houses:		46	

Table 4.12.Summary of total usable floor areas

GIZA Khentkawes Town				
Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
House K				
	125(niche only in 129)	sleeping room	2.1	
	126	unspecified	44.1	
	129	sleeping room	15.12	
	130	oven	11.62	
	131	corridor	20	
	132	unspecified	6.14	
	133	corridor	41.7	
			140.78	Lehner (2009): 137m2 gross area
				(213 m2 incl court)

Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
House E				
	68	bedroom	10.33	room refs from Tavares 2009
	69	cooking area	8.86	
	70	small room	3.47	
	71	bedroom	9.62	
	73	kitchen	12.97	
	74	vestibule	7.87	
	76	small chamber	2.5	
	77	small chamber	2.23	
	79	open courtyard	25.7	
	80	small chamber	4.54	
			88.08	Tavares (2009) measured 189 m2 as
				total gross area after successive changes

Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
House A				
	21	bedroom	11.14	(room refs from Hassan 1933)
	22	bedroom	7.56	
	23	porter's lobby	2.18	
	24	living room	9.88	
	25	kitchen	10.39	
	26	open court	10	
	27	reception room	18.66	
	28	doorway	2.00	
	29	water storage room	1.8	
	not numbered		1.53	
			75.16	

Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
House F				
	81	bedroom	11.1	Room refs from Hassan 1933 (mirroring A)
	82	bedroom	5	
	83	unspecified	2.8	
	84	porter's lobby	3.96	
	85	living room	10.51	
	86	reception room	25.14	
	87	kitchen	11.66	
	88	unspecified	1.75	
	89	water storage room	2.0	
	90	unspecified	1.48	
	91	open court	6.92	
	92	unspecified	2.72	
			85.04	

Table 4.13.Itemised usable floor areas (Giza)

KAHUN Mansions				
Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
Ricke-1				room refs from Ricke and Bietak (where different)
	1	patio	209.21	
	2	portico (B)	45.48	
	3	reception (Ri),vestibule (B)	50.44	
	4	middle hall (Ri), living room (B)	61.16	
	5	bedroom	27.17	
	6	side hall (Ri) adjoining room (B)	35.76	
	7	living room	23.7	
	8	adjoining room (B)	16.97	8+9 = 26.34
	9	dressing room (B)	9.47	
	10	bathroom	11.85	
	11-12 a 14	chambers	16.28	
	15	unspecified	16.92	
	16	harem hall (Bi), hall (B)	25.71	
	17	portico (B)	46.48	
	18	living room	24.45	
	19	bedroom	20.36	
	20	adjoining room (B)	8.02	
	21	dressing room (B)	8.44	
	22	bathroom	5.8	
	23	servant rooms(Ri),unspecified (B)	20.86	
	24	unspecified	16.96	
	25	access yard (Ri), patio (B)	58.82	
	26	portico (B)	26.81	
	27	living room	18.96	
	28	bedroom	17.64	
	29	adjoining room (B)	12.23	
	30	dressing room (B)	12.83	
	31	bathroom	4.38	
	32a34	servant rooms	7.56	
	35	servant rooms (Ri), domestic/storage/stair (B)	17.62	
	36	unspecified	4.99	
	37	open access (Ri), unspecified (B)	39.35	
	38	patio	49.52	
	39	portico (B)	13.43	
	40	unspecified (Ri), vestibule (B)	14.08	
	41	unspecified (Ri), adjoining room (B)	12.68	
	42	unspecified (Ri), living room (B)	16.68	
	43	unspecified (Ri), bedroom (B)	17.50	
	44	domestic/storage/stair (B)	11.33	
	45	patio +portico (B)	32.14	
	46	storage/stair (B)	11.11	
	47	servant rooms (Ri)	20.93	
	48	servant rooms (Ri)	18.63	
	49	patio	20.35	
	50	domestic/storage/stair (B)	5.67	
	51	unspecified	13.3	
	52	unspecified (Ri), servant rooms (B)	8.02	
	53	unspecified (Ri)	14.56	
	54	unspecified (Ri), servant rooms (B)	8.4	
	55	patio	26.18	
	56	unspecified	18.05	
	59 a 62	stables (Ri), storage (B)	18.76	
	63	stables (Ri), unspecified (B)	9.2	
	64	stables (Ri), unspecified (B)	17.77	
	65 a 72	storage	16.67	
	74	unspecified	60.69	
	75	unspecified	32.17	
	76	unspecified	34.95	
	77	porter's lodge (Ri), unspecified (B)	6.32	
	78	unspecified	10.24	
	80	vestibule (Ri), unspecified (B)	19.47	
	81	patio corridor (Ri), unspecified (B)	70.55	
	82	aux rooms corridor (Ri)unspecified (B)	42.86	
	83	vestibule (Ri), unspecified (B)	24.43	
			1619.32	Quirke (2005) 2.700m2 gross area
				(generic for mansions)

Table 4.14.Itemised usable floor areas (Kahun - mansions)

Building	Prop. Room No.	Room Reference	Sq.m	Comments
Ricke-2				
	1	patio	257.7	
	2	portico (B)	31.79	
	3	reception (Ri), vestibule (B)	44.95	
	4	middle hall (Ri), living room (B)	65.81	
	5	bedroom (B)	28.6	
	6	side hall (Ri) adjoining room (B)	39.26	
	7	living room	29.13	
	8	unspecified (Ri), adjoining room (B)	17.61	
	9	unspecified (Ri), dressing room (B)	11.64	
	10	bathroom	8.47	
	11	unspecified	19.51	
	12 a 14	chambers	19.54	
	16	harem's patio (Ri), patio (B)	29.14	
	17	portico (B)	47.68	
	18	living room	27.45	
	19	bedroom	13.87	
	20	unspecified (Ri), adjoining room (B)	14.51	
	21	unspecified (Ri), dressing room (B)	14.96	
	22	bathroom	14.49	
	23	servants room (Ri),domestic/storage/stairs (B)	19.3	
	24	unspecified	11.68	
	25	patio	61.98	
	26	portico (B)	21.18	
	27	unspecified (Ri), living room (B)	16.95	
	28	unspecified (Ri), bedroom (B)	13.2	
	29	unspecified (Ri), adjoining room (B)	12.26	
	30	unspecified (Ri), dressing room (B)	13.27	
	31	unspecified (Ri), bathroom (B)	11.58	
	32	unspecified (Ri), servant rooms (B)	10.63	
	33	unspecified (Ri), servant rooms (B)	9.79	
	34	unspecified	8.84	
	37	adjoining rooms corridor (Ri), unspecified (B)	53.08	
	38	patio	23.57	
	39	portico (B)	11.83	
	40	servant rooms (Ri), living room, bedroom (B)	17.47	
	41	unspecified (Ri), adjoining room (B)	8.5	
	44	servant rooms (Ri), domestic/storage/stairs (B)	16.67	
	45	patio + portico (B)	35.88	
	47	unspecified	13.43	
	48	unspecified	13.88	
	49	patio (B)	14.73	
	51	unspecified	13.24	
	52	unspecified (Ri), servant rooms (B)	5.26	
	53	unspecified	13.44	
	54	unspecified (Ri), servant rooms (B)	4.99	
	55	access yard (Ri), patio (B)	70.57	
	56	unspecified	22.09	
	57	unspecified	8.9	
	58	unspecified	9.05	
	59 a 62	stables (Ri), magazines (B)	20.75	
	63	stables (Ri), unspecified (B)	6.49	
	64	stables (Ri), unspecified (B)	10.94	
	65 a 73	storage	15.61	
	74	patio	90.74	
	75	unspecified	13.54	
	76	unspecified	13.05	
	77	unspecified	2.45	
	78	unspecified	3.1	
	80	vestibule (Ri), unspecified (B)	15.4	
	81	open corridor (Ri), unspecified (B)	28.88	
	82	unspecified	16.49	
	83	vestibule (Ri), unspecified (B)	20.54	
	84	unspecified	11.13	
			1572.46	Quirke (2005) 2.700m2 gross area
				(generic for mansions)

Table 4.14.Itemised usable floor areas (Kahun - mansions) (cont.)

KAHUN
Ranks

Building	Prop. Room No.	Room Reference	Sq.m	Comments
Rank b				
	a		12.61	
	b		5.46	
	c		11.26	
	d		12.81	
	e		2.76	
	f		17.4	
	g		7.54	
	h		9.95	
	i		17.31	
	j		17.6	
	k		11.1	
			125.8	Quirke (2005) 168m2 generic gross area

Building	Prop. Room No.	Room Reference	Sq.m	Comments
Rank a				
	a		4.82	
	b		7.01	
	c		5.66	
	d		12.24	
	e		16.09	
	f		13.27	
	g		17.47	
	h		10.76	
			87.32	Quirke (2005) 168m2 generic gross area

Table 4.15.Itemised usable floor areas (Kahun - ranks)

ELEPHANTINE H.G.S.				
Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
H10				
	A	animal shed? (Tethering stone)	13.35	
	B	unspecified	7.34	
	C	courtyard?	29.5	
	D	unspecified	15.36	
	E	unspecified	12.61	
	F	unspecified	6.63	
	G	unspecified	8	
			92.79	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
H12				
	A	furnace chamber (ash)	4.56	
	B	furnace chamber (ash)	2.9	
	C	animal keeping (manure traces)	13.42	
	D	worship?	5.84	
	E	unspecified	4.05	
			30.77	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
H25b				
	A	hearth/ remains of oven	13.23	
	B	kiln	5.09	
	C	patio	31.18	
	D	living room	14.67	
	E	ash furnace chamber	4.16	
	F	ash furnace chamber	3.45	
	G		3.24	
			75.02	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
H25a				
	A	ash/ furnace area	13.1	
	B	oven use/mouse dung/bread moulds/organic waste dump	5.67	
	C	patio/ storage units/burials	45	
	D		n/a	
	E	burnt marks/burials	11.53	
	F		2.5	
	G		n/a	
			77.8	

MAIN CITY				
Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
H86b				
	A	entrance (goat dung)	11.11	
	B	corridor/animal keeping (goat dung)	5.15	
	C	corridor/animal keeping (goat dung)	6.71	
	D	ash	5.63	
	E	patio storage units	77.2	
	F		6.1	
	G	living rooms	29.69	
	H	living rooms	15.18	
	I		n/a	
	J		n/a	
	K	entrance corridor (temporary flint processing area)	15.17	
			171.94	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
H86a				
	A		12.18	
	B	animal keeping	4.99	
	C	animal keeping	7.58	
	D	furnace chamber (bread moulds)	6.56	
	E	patio (ash/production/storage)	91.75	
	F	burial?	3.3	
	G	burial	29.3	
	H	living room	14.9	
			170.56	

Table 4.16.Itemised usable floor areas (Elephantine)

TELL EL-DABA F/I

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 5				
	136	kitchen/hall	3.92	
	137	courtyard	8.61	
	no number	main room	5.54	
	131	adjoining room	2.54	
			20.61	
				(Bietak 1996): 25m2 gross area

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 6				
	141	hall	2.25	
	142	kitchen	1.75	
	143	courtyard	8.52	
	132	main room	6.11	
	133	adjoining room	2.28	
			20.91	(Bietak 1996): 25m2 gross area

Table 4.17.Itemised usable floor areas (Tell el-Daba, Middle Kingdom)

LISHT North

Building	Prop. Room No.	Room Reference	Sq.m	Comments
A1.3				room refs from Arnold 1993
	a	entrance chamber	7.72	
	b	unknown/cooking chamber	4.46	
	c	courtyard kitchen/stable	21.3	(including corridor with a)
	d	square room	10.88	
	e	corridor	9.45	
	f	ante-chamber	8.49	
	g	storage	4.33	
	h	main hall	18.77	Arnold (1996): 7x10cubits
	i	private chamber	12.2	
	k	ante-chamber	4.78	
	l	tripartite unit	3.06	
	m	tripartite unit	7.3	
	n	tripartite unit (private cham)	8.22	(4.14+3.26)
	o	entrance room	17.16	
	p	entrance room	6.74	
			144.88	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
A3.3 phase 2-3				
	a	entrance hall/court	19.7	
	b	living room (bipartite)	10.27	
	c	living room (bipartite)	10.24	
	d	private chamber	13.81	
	e	office	16.42	entrance hall:stable/kitchen later
	f	unspecified	5.95	
	g	unspecified	3.29	
			79.68	

Table 4.18.Itemised usable floor areas (Lisht)

TELL EL-DABA A/V

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 32-33				
	32	unknown	4.51	min
	33	unknown	8.12	min
			12.63	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 81-83				
	81	burials (later?)	32.09	
	82	unknown	16.74	
	83	unknown	3.91	
			52.74	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 92-93				
	92	unknown	22.71	
	93	unknown	1.62	
			24.33	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 56-59				
	56	economic space (flint)	19	
	57	unknown	3.65	
	58	unknown	2.93	
	59	unknown	2.41	
			27.99	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House 173-176				
	173	unknown	8.52	
	174	unknown	4.98	min
	175	unknown	3.34	
	176	unknown	12.83	
			29.67	

Table 4.19.Itemised usable floor areas (Tell el-Daba)

DEIR EL-BALLAS S OF N PALACE

Building	Prop. Room No.	Room Reference	Sq.m	Comments
House E				
	RM 1	stairwell	3.34	
	RM 2	sherd/wood/bones/storage jar	7.2	
	RM 3	twine/textile/bone inlay	29.8	
	RM 4		52.72	
	RM 5		26.94	
	RM 5a	textile workshop?	11.31	
	E1		10.74	
	E2		15.58	min
	E3		9.44	min
	SE1-W2	vestibule area?	19.45	min
	SE2		6.56	min
	S1		8.97	min
	S2		9.14	min
	S3		6.27	
	W3			
			217.46	rooms with min are not totally excavated

Table 4.20.Itemised usable floor areas (Deir el-Ballas)

MEMPHIS
RAT

Building	Prop. Room No.	Room Reference	Sq.m	Comments
7,23				
	7	unspecified	21.87	min
	23	yard	19.3	min
			41.17	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
3,21				
	3	unspecified	33.65	min
	21	unspecified	16.68	min
			50.33	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
2,7,14				
	2,17	court/cooking room (storage)	18.36	min
	14	unspecified	7.29	min
			25.65	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
8,9,22				
	8	yard	17.87	min
	9	silo	11.33	
	22	unspecified	4.51	min
			33.71	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
6,24				
	24	oven	8.08	
	6a	unspecified	7.11	
	6b	unspecified	8.45	
	no number	unspecified	1.73	
			25.37	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
5,18,19,20,26,27				
	5	long chamber	10.35	
	18	entrance room/shop/workshop (flints)	5.76	
	19	side room	3.47	
	20	corridor/stairs?	5	
	26	unspecified	2.3	
	27	unspecified	2.7	
			29.58	

Table 4.21.Itemised usable floor areas (Memphis)

AMARNA
Main City

Building	Prop. Room No.	Room Reference	Sq.m	Comments
O47.8				
	1		2.45	
	2		1.93	unspec.
	3		1.45	
	4		9.72	
	5		8.3	
	6		2.06	
	7		3.6	
	8	broad hall	7.32	
	9	small room	1.79	cluster b
	10	small room	1.78	
	11	deep hall	12.44	
	12	side room	2.59	
	13	courtyard	123.61	courtyard
	14	bedroom	8.25	
	15a	storage	3.29	cluster a
	15	courtyard	16.39	courtyard
	16	storage	2.8	
	17	utility room/workshop	16.07	cluster a
	18	deep hall	18.97	
	19	staircase	2.37	
	20	broad hall	9.71	
	21	anteroom	5.52	
	22	side room	8.51	
	23	courtyard	71.7	courtyard
	24	courtyard	109.9	courtyard
			452.52	
			305.21	courtyards
			149.31	buildings only

Building	Prop. Room No.	Room Reference	Sq.m	Comments
O49.14				
	1	adjoining room	3.91	
	2	adjoining room	3.67	
	3	main living room	11.87	
	4	entrance hall	9.46	
	5	main living room	12.06	
	6	anteroom	6.22	
	7	courtyard	10.95	
	8	adjoining room	3.05	
	9	main living room	10.44	
	10	entrance hall to 9	4.46	
	11	adjoining room	1.09	
			77.18	

Table 4.22.Itemised usable floor areas (Amarna)

AMARNA **Main City**				
Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
N49.6				
	1	narrow passage	7.64	
	2	anteroom	6.81	
	3	main living room	12.72	
	4	secondary room	2.25	
	5	narrow passage	7.11	
	6	staircase	3.21	
	7	auxiliary room	5.32	
	8	auxiliary room	3.41	
	9	narrow passage	3.22	
	10	small room	3.26	
	11	small room	3.3	
	12	main living room	9.69	
	13	staircase	1.72	
	14	unspecified	2.75	
	15	lobby	5.26	
	16	courtyard	15.29	
	17	atrium	17.71	
	18	steps	1.61	
	19	elongated transverse chamber	10.82	
	20	side room	6.1	
	21	deep central hall	14.25	
	22	side room	7.85	
	23	side room	2.23	
	24	side room	2.37	
	25	main vestibule	9.36	
	26	vestibule	5.85	
	27		3.86	
	28		3.58	
	29	vestibule	12.85	
	30		2.8	
	31		8.97	
	32	passage	13.33	
	33	side room	3.89	
	34	side room	4.31	
	35	main living room	12.46	
	36	steps	2.23	
	37	steps	1.49	
	38	anteroom	10.63	
			251.51	

Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
N50.19				
	1	living room	3.59	
	2		3.27	
	3		12.21	
	4		8.25	

Table 4.22.Itemised usable floor areas (Amarna) (cont.)

AMARNA Main City				
	5	stairwell	10.01	
	6		1.73	
			39.06	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
N51.4				
	1	entrance hall	6.28	
	2	staircase/gap	5.28	
	3	square room	5.56	
	4		3.07	
	5		4.86	
	6	broad hall	14.25	
	7	deep hall	20.53	
	8		2.38	
	9		5.02	
	10	anteroom	7.04	
	11	bedroom	10.3	
	courtyard	courtyard	275.221	
			359.791	
			84.57	building only

Building	Prop. Room No.	Room Reference	Sq.m	Comments
P47.6				
	1	bedroom	8.4	
	2	outbuilding	3.32	
	3	small room	4.03	
	4	entrance hall	4.58	
	5	broad hall	14.91	
	6	deep hall	20.99	
	7	anteroom	4.56	
	8	square room	8.84	
	9		17.35	
	10	small room	3.48	
	11	staircase	1.88	
	12	side room	6.11	
	13	staircase	2.24	
	14	storage chamber	4.48	
	15	storage chamber	1.87	
	courtyard	courtyard	117.18	
			224.22	
			107.04	building only

Building	Prop. Room No.	Room Reference	Sq.m	Comments
Q46.2				
	1			included in courtyard
	2		4.92	
	3	bedroom	11.06	

Table 4.22.Itemised usable floor areas (Amarna) (cont.)

AMARNA Main City				
	4	dressing room	4.78	
	5	side room	4.65	
	6	entrance hall	8.54	
	7		3.5	
	8	night rooms	4.48	
	9		3.06	
	10	square room	12.39	
	11	side room	7.8	
	12	side room	7.41	main house
	13	deep hall	28.14	
	14	side room	7.46	
	15		7.2	
	16	staircase	7.66	
	17	small room	3.47	
	18	small room	3.46	
	19		2.67	
	20	deep hall	25.44	
	21	second hall	5.36	
	22	first antechamber+entrance steps	8.51	
	1	stable?	20.21	
	2		1.54	
	3		1.82	
	4		1.53	outbuildings
	5		6.35	
	6	stable?	32.54	
	courtyard a		286.47	
	courtyard b+1		896.91	
			1419.33	
			171.96	main house only

Building	**Prop. Room No.**	**Room Reference**	**Sq.m**	**Comments**
Q47.23				
	1	unknown	15.24	
	2	unknown	8.09	
	3	unknown	13.52	
	4		18.12	
	5		0.8	
	6		10.96	
	7		1.5	
	no number		2.86	
	8	staircase	3.6	
	9		9.58	
	10		11.89	
	11	courtyard	19.2	
	12	side room	4.21	
	13	side room	6.57	
	14	hallway	9.56	
	15	side room	2.69	

Table 4.22.Itemised usable floor areas (Amarna) (cont.)

AMARNA Main City				
	16	side room	2.87	
	17	side room	1.37	
	18	side room	4	
	19	small room	2.52	
	20	main living room	9.64	
	21	small room	4.5	
	22	side room	3.36	
	23	small room	5.79	
	24	small room	2.07	
	25	main living room	13.23	
	26	stairs	1.38	
	27	stairs	1.63	
	28	small room	4.92	
	29	large side room	12.33	
	30	open hall	13.89	
			221.89	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
Ranefer phase II				
	1	tranverse hall	44.42	
	2	central hall	34.77	
	3	side room	4.6	
	4	south-east suite	8.39	
	5		18.99	
	5a		2.35	
	5b		10.67	
	6	south-east suite	2.96	
	7	south-east suite	5.49	
	8	south-east suite	10.2	
	9	entrance hall	16.57	
	10	side room	4.76	
	11	side room	1.85	
	12	side room	1.9	
	13	staircase room	6.85	
	14	south suite	3.14	
	15	south suite	12.57	
	16	south suite	7.6	
	17	south suite	2.67	
			200.75	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
Ranefer phase I				
	A1	transverse hall	23.56	
	A2	central hall	18.59	

Table 4.22.Itemised usable floor areas (Amarna) (cont.)

AMARNA Main City				
	A4	south-east suite	6.11	
	A5	courtyard	25.42	
	A5a	courtyard	4.04	
	A7	south-east suite	5.33	
	A8	south-east suite	11.22	
	A9	entrance hall	6.66	
	A10	ante-room	6.61	
	A11	side chamber	1.52	
	A12	side chamber	1.46	
	A13	side chamber	1.42	
	A14	side chamber	1.75	
	A15	south chamber	4.39	
	A16	south-east suite	2.92	
	A17	south chamber		
			121	

Table 4.22.Itemised usable floor areas (Amarna) (cont.)

KARNAK
EAST SACRED LAKE AMUN

Building	Prop. Room No.	Room Reference	Sq.m	Comments
I				
	a	courtyard	16.88	
	b	vestibule	3.28	
	c		8.48	
	d		15.81	
	e	bedroom	7.54	
	f		4.31	
	g		1.32	
	h	loggia	30.7	
	i	cachette/cold room?	1.82	
	j	paved corridor	5.91	
			96.05	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
II				
	a	court	34.31	
	b		19.33	
	c		4.6	
	d		4.17	
	e	corridor/stairs?	7.55	
	f	kitchen/storage room	7.26	
			77.22	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
III				
	a		19.84	
	b		15.64	
	c		9.59	
	d	corridor storage/kitchen	2.6	
	e	court (oven)	27.65	
	f		5.98	
	g	stairwell	3	
	h		10.14	
	i		9.31	
			103.75	

Table 4.23.Itemised usable floor areas (Karnak)

ASHMUNEIN
SITE W

Building	Prop. Room No.	Room Reference	Sq.m	Comments
j11-k11 level 1				
	left		10.73	
	right		14.64	
			25.37	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
j10-k10 level 1b				
	1ii		8.43	min
	1iii		13.42	
	1iv		4.63	
	1v		5.13	
			31.61	

Building	Prop. Room No.	Room Reference	Sq.m	Comments
j10-k10 level 3				
	3i		12.69	
	3ii	hearth	12.17	
	3iii	corridor/stairs	4.7	
	3iv		6.87	
	3v		4.22	
	3vi		11.75	
	3vii		2.32	
	3viii	courtyard?	5.8	
			60.52	

Table 4.24.Itemised usable floor areas (el-Ashmunein)

Site	Selected residential zone	selected residential zone approx area (km2)	no. houses areas analysed	< 50 m2 houses	50-100m2	100-200m2	>200m2
Ashmunein	Site W	*unknown	3	2	1	0	0
Deir el-Ballas	North Palace	**unknown	1	0	0	0	1
Memphis (Rabia)	RAT	0.0005	6	5	1	0	0
Tell el-Daba SIP	A/V	0.0018	5	4	1	0	0
Karnak	East sacred lake Amun	0.0025	3	0	2	1	0
Elephantine	North and South city	0.0108	6	1	3	2	0
Tell el-Daba MK	F/I	0.014	2	2	0	0	0
Lisht	North cemetery	0.024	2	0	1	1	0
Giza	Khentkawes	0.06	4	0	3	1	0
Kahun	Kahun town	0.12	4	0	1	1	2
Amarna	Main City	2.1	10	1	1	1	7
TOTAL			46	15	14	7	10

* excavated 600m2

** 0.0048 (north city) and 0.006 (south city)

Table 4.25. Comparison between individual house areas and overall site areas

Site	Topography	< 50 m2 houses	50-100m2	100-200m2	>200m2
Memphis (Rabia)	Mound	5	1	0	0
Ashmunein	Mound	2	1	0	0
Tell el-Daba MK	Mound	2	0	0	0
Tell el-Daba SIP	Mound	5	0	0	0
Deir el-Ballas	plain	0	0	0	1
Karnak	plain	0	2	1	0
Kahun	plain	0	1	1	2
Amarna	plain	1	1	1	6
Lisht	plateau	0	1	1	0
Giza	plateau	0	3	1	0
Elephantine	plateau	1	3	2	0

Table 4.26. House areas in relation to environmental conditions

Site	House	Usable floor area	Social group	comments
Giza - Khentkawes Town	House K	125.66	priest	
	House E	68.89	priest	reocupation
	House A	50.11	priest	
	House F	85.04	priest	
LISHT - North	A1.3	144.88	craftsman?	reocupation
	A3.3 phase 2-3	79.68	scribe/priest?	
KAHUN - Mansions	Ricke-2	1629.38	high-ranking officials	
	Ricke-1	1599.52	high-ranking officials	
KAHUN - Ranks	Rank b	125.8	workers/craftsmen	
	Rank a	87.32	workers/craftsmen	
ELEPHANTINE -	H10	92.79	admin officials?	
	H12	30.77	admin officials?	
	H25b	75.02	admin officials?	
	H25a	77.8	admin officials?	
	H85b	171.94	admin officials?	
	H85a	164.05	admin officials?	
TELL EL-DABA - F/I	House 5	20.61	workers/farmers?	
	House 6	20.91	workers/farmers?	
DEIR EL-BALLAS	House E	min 217.46	palace staff?	
TELL EL-DABA - A/V	House 32-33	min 12.63	unknown	
	House 81-83	52.74	unknown	
	House 92-93	24.33	unknown	
	House 56-59	27.99	unknown	
	House 173-176	min 29.67	unknown	
MEMPHIS - RAT	7,23	41.17	priest?	
	3,21	50.33	craftsman?	
	2,7,14	25.65	craftsman?	
	8,9,22	33.71	priest	
	6,24	25.37	craftsman?	
	5,19,20,26,27	29.58	craftsman?	
AMARNA	Ranefer phase II	200.75	high-ranking official	
	Ranefer phase I	121	high-ranking official	
	Q47.23	452.52		
	N50.19	39.06		
	O49.14	77.18		
	N49.6	251.51		
	O47.8	452.52		
	N51.4	359.791		
	P47.6	224.22		
	Q46.2	1419.33		
KARNAK	I	96.05	priest	
	II	77.22	priest	reocupation
	III	103.75	priest	
ASHMUNEIN	j11-k11 level 1c	min 25.37	unknown	
	j10-k10 level 1b	min 31.61	unknown	
	j10-k10 level 3	60.52	unknown	

Table 4.27. House areas in relation to social groups

Site	city plan	< 50 m2 houses	50-100m2	100-200m2	>200m2
Memphis (Rabia)	organic	5	1	0	0
Ashmunein	organic	2	1	0	0
Tell el-Daba SIP	organic	5	0	0	0
Deir el-Ballas	organic	0	0	0	1
Amarna (Main City)	organic	1	1	1	6
Elephantine	organic	1	3	2	0
Lisht	organic	0	1	1	0
Tell el-Daba MK	planned	2	0	0	0
Karnak	planned	0	2	1	0
Kahun	planned	0	1	1	2
Giza	planned	0	3	1	0

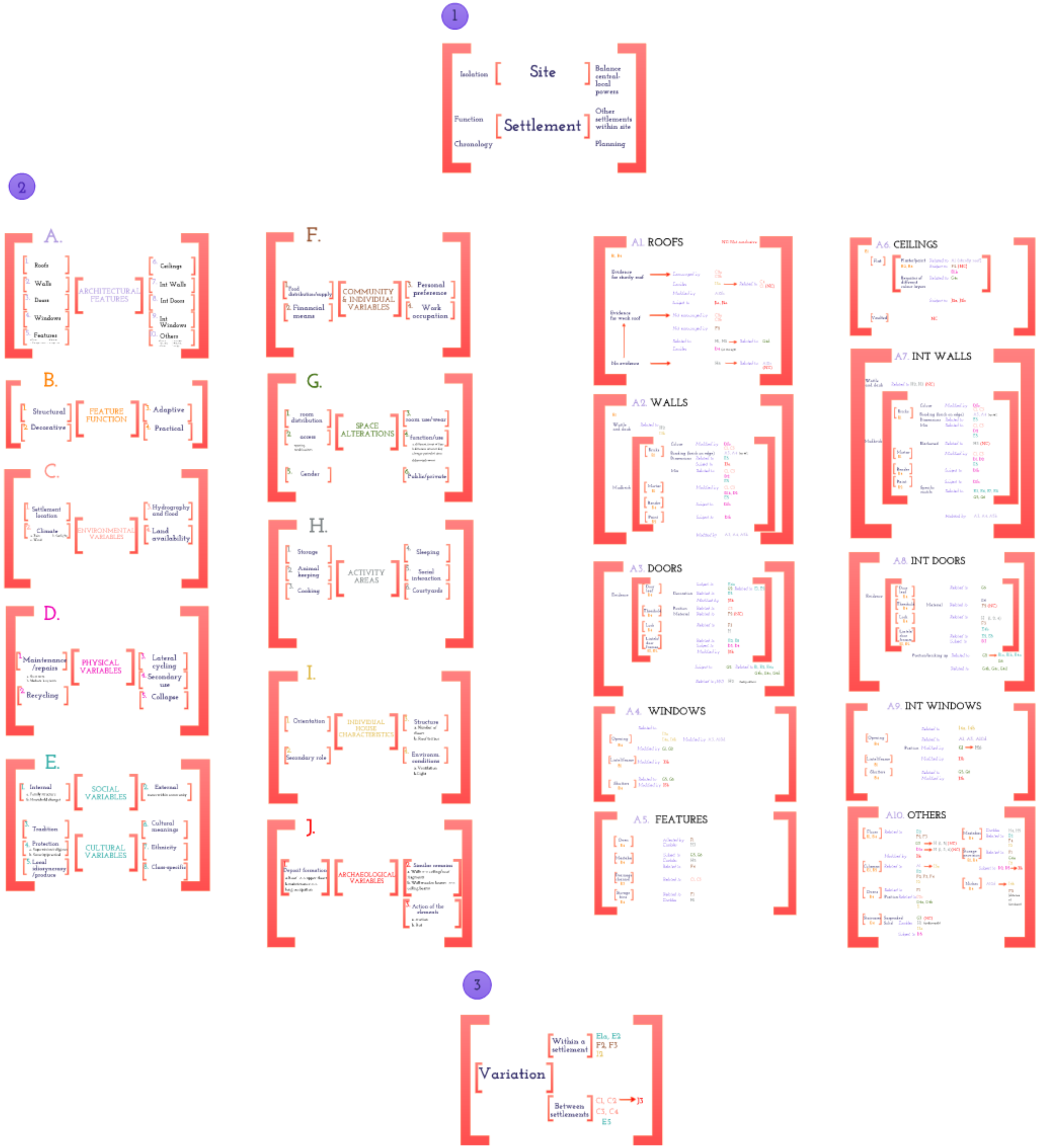
Table 4.28. House areas in relation to urban development

Site	House	underground silos location	silos and bins location	buried pots/holes location	small containers location	magazines
Giza - Khentkawes Town	House K					
	House E		courtyard (F)			
	House A					
	House F					
LISHT - North	A1.3					x
	A3.3 phase 2-3		outside courtyard			
KAHUN - Mansions	Ricke-1					x
	Ricke-2					x
KAHUN - Ranks	Rank b		various			
	Rank a		various			
ELEPHANTINE -	H10	courtyard		courtyard		
	H12					
	H25b		courtyard			
	H25a	courtyard	courtyard		bread room	
	H86b	courtyard	courtyard			
	H86a		courtyard		furnace room (bread)	
TELL EL-DABA - F/I	House 5				courtyard	
	House 6			courtyard		
DEIR EL-BALLAS	House E					
TELL EL-DABA - A/V	House 32-33			both rooms		
	House 81-83			entrance		
	House 92-93					
	House 56-59					
	House 173-176					
MEMPHIS - RAT	7,23					
	3,21					
	2,17,14		unclear		courtyard?	
	8,9,22	open area	courtyard?			
	6,24					
	5,19,20,26,27					
AMARNA	Ranefer phase II					
	Ranefer phase I	courtyard				
	Q47.23			living rooms	small room/side/open hall	
	N50.19					
	O49.14			side room off main	main living room	
	N49.6	small room				
	O47.8			broad hall,deep hall side room /utility		x
	N51.4	bedroom				
		anteroom				
	P47.6			deep hall/ anteroom / bedroom	under stairs / small room	
	Q46.2					x
KARNAK	I					

Table 4.29. Storage location across houses

Site	House	underground silos location	silos and bins location	buried pots/holes location	small containers location	magazines
	II					
	III			kitchen / storage		
ASHMUNEIN	j11-k11 level 1c					
	j10-k10 level 1b		unclear /open			
	j10-k10 level 3					

Table 4.29. Storage location across houses (cont.)



1
Isolation
Site
Balance central-local powers
Function
Settlement
Other settlements within site
Chronology
Planning
2
A.
Roofs
Walls
Doors
Windows
Features
ARCHITECTURAL FEATURES
Ceilings
Int Walls
Int Doors
Int Windows
Others
B.
Structural
Decorative
FEATURE FUNCTION
Adaptive
Practical
C.
Settlement location
Climate
ENVIRONMENTAL VARIABLES
Hydrography and flood
Land availability
D.
Maintenance /repairs
Recycling
PHYSICAL VARIABLES
Lateral cycling
Secondary use
Collapse
E.
Internal
External
SOCIAL VARIABLES
Tradition
Protection
Local idiosyncrasy /produce
CULTURAL VARIABLES
Cultural meanings
Ethnicity
Class-specific
F.
Food distribution/supply
Financial means
COMMUNITY & INDIVIDUAL VARIABLES
Personal preference
Work occupation
G.
room distribution
access
Gender
SPACE ALTERATIONS
room use/wear
function/use
Public/private
H.
Storage
Animal keeping
Cooking
ACTIVITY AREAS
Sleeping
Social interaction
Courtyards
I.
Orientation
Secondary role
INDIVIDUAL HOUSE CHARACTERISTICS
Structure
Environm. conditions
J.
Deposit formation
ARCHAEOLOGICAL VARIABLES
Similar remains
Action of the elements
A1. ROOFS
A2. WALLS
A3. DOORS
A4. WINDOWS
A5. FEATURES
A6. CEILINGS
A7. INT WALLS
A8. INT DOORS
A9. INT WINDOWS
A10. OTHERS
3
Variation
Within a settlement
E1a, E2
F2, F3
J2
Between settlements
C1, C2
J3
C3, C4
E5

1

Isolation

Site

Balance central-local powers

Function

Settlement

Other settlements within site

Chronology

Planning

2

A.

ARCHITECTURAL FEATURES

1. Roofs
2. Walls
3. Doors
4. Windows
5. Features
   a.Ovens
   b. Mastabas
   c. Drainage channel
   d. Storage bins
6. Ceilings
7. Int Walls
8. Int Doors
9. Int Windows
10. Others
    a.Floors
    b.Columns
    c.Ovens
    d.Staircases
    e.Mastabas
    f.Storage

B.

1. Structural
2. Decorative

FEATURE FUNCTION

3. Adaptive
4. Practical

C.

ENVIRONMENTAL VARIABLES

1. Settlement location

2. Climate
   a. Rain
   b. Sunlight
   c. Wind

3. Hydrography and flood

4. Land availability

D.

PHYSICAL VARIABLES

1. Maintenance/repairs
   a. Short term
   b. Medium-long term
2. Recycling
3. Lateral cycling
4. Secondary use
5. Collapse

E.

SOCIAL VARIABLES

1. Internal
   a. Family structure
   b. Household changes

2. External
   status within community

CULTURAL VARIABLES

3. Tradition

4. Protection
   a. Superstition/religious
   b. Security/practical

5. Local idiosyncrasy /produce

6. Cultural meanings

7. Ethnicity

8. Class-specific

F.

1. Food distribution/supply

2. Financial means

COMMUNITY & INDIVIDUAL VARIABLES

3. Personal preference

4. Work occupation

G.

SPACE ALTERATIONS

1. room distribution

2. access

opening modifications

3. room use/wear

4. function/use

a. different times of year

b.different times of day

c.longer period of time

d.demoted rooms

5. Gender

6. Public/private

H.

ACTIVITY AREAS

1. Storage
2. Animal keeping
3. Cooking
4. Sleeping
5. Social interaction
6. Courtyards

I.

INDIVIDUAL HOUSE CHARACTERISTICS

1. Orientation

2. Secondary role

3. Structure
   a. Number of floors
   b. Roof terrace

4. Environm. conditions
   a. Ventilation
   b.Light

J.

ARCHAEOLOGICAL VARIABLES

1. Deposit formation

a.Roof <-> upper floors

b.maintenance <-> long occupation

2. Similar remains

a. Walls <-> ceiling/roof fragments

b. Wall wooden beams <-> ceiling beams

3. Action of the elements

a. erosion

b. Rot

A1. ROOFS

NC: Not conclusive

B1, B4

Evidence for sturdy roof →

- *Encouraged by* C2a, C2b
- *Enables* I3a → *Related to* C4, C1 (NC)
- *Modified by* A10b
- *Subject to* J1a, J2a

Evidence for weak roof →

- *Not encouraged by* C2a, C2b
- *Not encouraged by* F2
- *Related to:* H1, H2 → *Related to:* G4d
- *Enables* D4 (as storage)

No evidence → H6 → *Related to:* A10c (NC)

A2. WALLS

B1

Wattle and daub — *Related to* H2, I3b

Mudbrick

- **Bricks** (B1)
  - Colour — *Modified by* D1b, C1, C3
  - Bonding (brick on edge) — A3, A4 (rest NC)
  - Dimensions — *Related to* E5; *Subject to* J3a
  - Mix — *Related to* C1, C3, D2, E5
- **Mortar** (B1) — *Modified by* C1, C3, D1b, D2, E5
- **Render** (B4) — *Subject to* D1b
- **Paint** (B2) — *Subject to* D1b

Modified by A3, A4, A5b

A3. DOORS

Evidence

Door leaf
B4

Subject to E4a
G2 Related to E1, E2
Decoration Related to E5
Modified by J3b

Threshold
B4

Position Related to C3
Material Related to F2 (NC)

Lock
B4

Related to F3
H

Lintels/ door frames
B1, B2

Related to E2, E8
Subject to D3, D4
Modified by J3b

Subject to G2 Related to E1, E2, E4a
G4b, G4c, G4d

Related to (NC) H2 (back position)

A4. WINDOWS

[Opening] B4

Related to I3a, I4a, I4b — Modified by A3, A10d

Modified by G1, G2

[Lintel/frame] B1

Modified by J3b

[Shutters] B4

Related to G5, G6

Modified by J3b

A5. FEATURES

Oven B4	*Affected by* *Enables*	F1 H3
Mastaba B4	*Subject to* *Enables* *Related to*	G5, G6 H5 F4
Drainage channel B3	*Related to*	C1, C3
Storage bins B4	*Related to* *Enables*	F1 H1

A6. CEILINGS

B1

Flat	Plaster/paint	*Related to*	A1 (sturdy roof)
	B2, B4	*Subject to*	F2 (NC) D1b
	Remains of different colour layers	*Related to*	G4c
		Subject to	J2a, J2b
Vaulted		NC	

A7. INT WALLS

Wattle and daub
Related to H2, H3 (NC)

Mudbrick

Bricks
B1

Colour — *Modified by* — D1b
C1, C3

Bonding (brick on edge) — A3, A4 (rest NC)

Dimensions — *Related to* — E5

Mix — *Related to* — C1, C3
D2
E5

Blackened — *Related to* — H3 (NC)

Mortar
B1

Modified by — C1, C3
D1, D2
E5

Render
B4

Subject to — D1b

Paint
B2

Subject to — D1b

Specific motifs — *Related to* — E3, E6, E7, E8
G5, G6

Modified by — A3, A4, A5b

A8. INT DOORS

Evidence	Door leaf B4		*Related to*	G6
	Threshold B4	Material	*Related to*	G4 F2 (NC)
	Lock B4		*Related to*	H (1, 2, 4) F3 E4b
	Lintels/ door frames B1, B2		*Related to* *Subject to*	E2, E8 D3
		Position/bricking up	*Related to*	G2 → E1a, E1b, E4a G6
			Related to	G4b, G4c, G4d

A9. INT WINDOWS

		Related to	I4a, I4b
[Opening] B4		*Related to*	A1, A3, A10d
	Position	*Modified by*	G1 → H6
[Lintel/frame] B1		*Modified by*	J3b
[Shutters] B4		*Related to*	G5, G6
		Modified by	J3b

A10. OTHERS

Floors B1, B4
- *Related to* E2
- F2, F3
- G3 → H (1, 5) (NC)
- D1a → H (1, 3, 6)(NC)
- *Modified by* J1b

Columns B1, B2
- *Related to* A1 → I3a
- E2
- F2, F3, F4
- I2

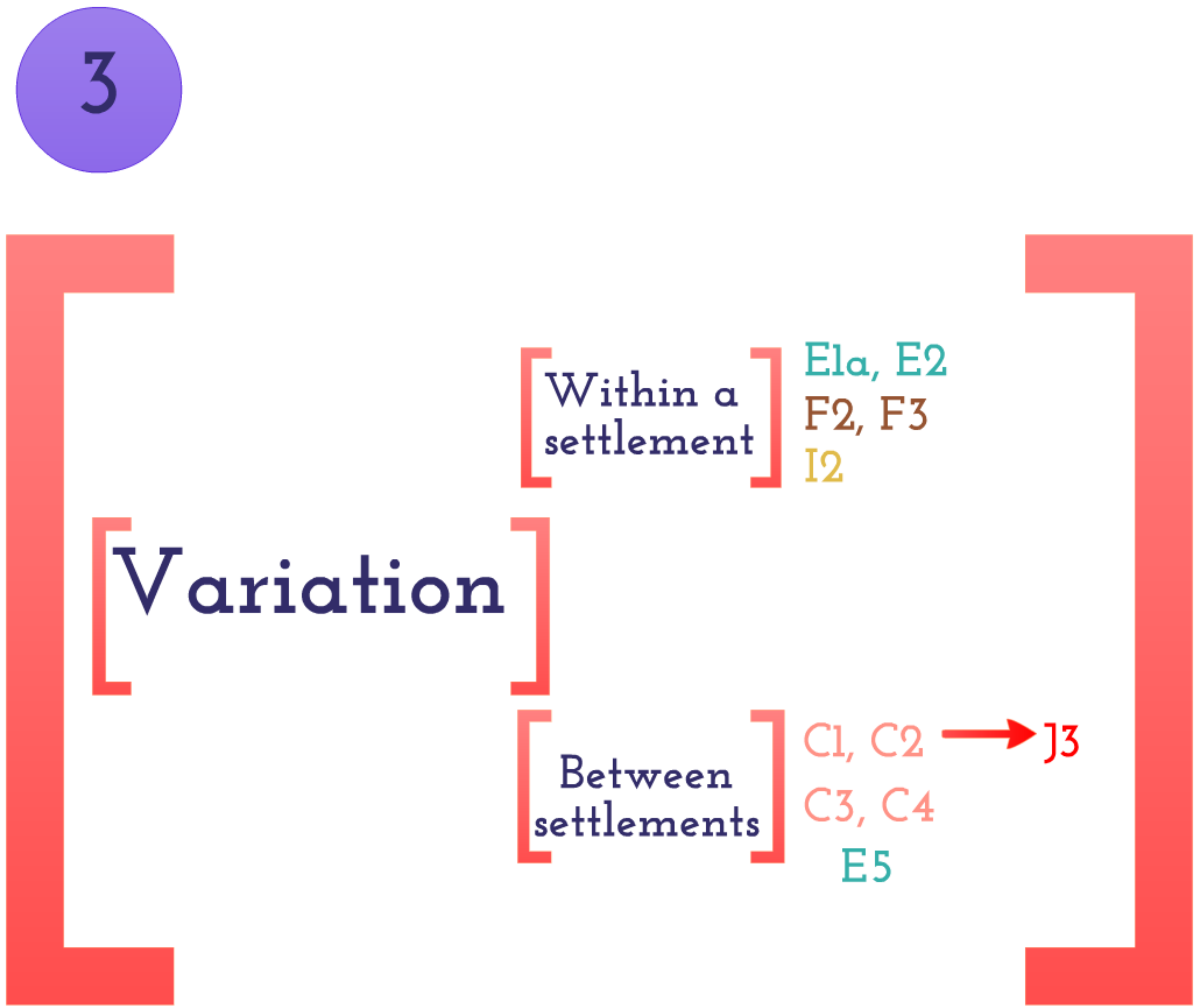
Ovens B4
- *Related to* F1
- **Position** *Related to* C2c
- G4a, G4b
- I1

Staircases B4
- **Suspended** G3 (NC)
- **Solid** *Enables* H1 (underneath)
- I3a
- *Subject to* D5

Mastabas B4
- *Enables* H4, H5
- *Related to* E2
- F4
- I2

Storage provision B1, B4
- *Related to* F1
- G4a
- I2
- *Subject to* D2, D5 → J1b

Niches B4
- A10d → I4b
- F2 (absence of furniture)


3
Variation
Within a settlement
E1a, E2
F2, F3
I2
Between settlements
C1, C2
J3
C3, C4
E5